HITACHI

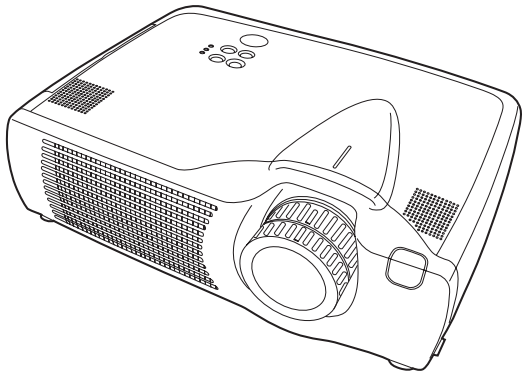
SM0538

SERVICE MANUAL

CPX430WA(C7X2)

⚠ Warning

The technical information and parts shown in this manual are not to be used for: the development, design, production, storage or use of nuclear, chemical, biological or missile weapons or other weapons of mass destruction; or military purposes; or purposes that endanger global safety and peace. Moreover, do not sell, give, or export these items, or grant permission for use to parties with such objectives. Forward all inquiries to Hitachi Ltd.



Caution

Be sure to read this manual before servicing. To assure safety from fire, electric shock, injury, harmful radiation and materials, various measures are provided in this Hitachi Multimedia LCD Projector. Be sure to read cautionary items described in the manual to maintain safety before servicing.

Service Warning

1. When replace the lamp, avoid burns to your fingers. The lamp becomes very hot.
2. Never touch the lamp bulb with a finger or anything else. Never drop it or give it a shock. They may cause bursting of the bulb.
3. This projector is provided with a high voltage circuit for the lamp. Do not touch the electric parts of power unit (main), when turn on the projector.
4. Do not touch the exhaust fan, during operation.
5. The LCD module assembly is likely to be damaged. If replacing to the LCD LENS/PRISM assembly, do not hold the FPC of the LCD module assembly.
6. Use the cables which are included with the projector or specified.

Contents

1. Features ---------- 2
2. Specifications ---------- 2
3. Unit Layout ---------- 3
4. Adjustment ---------- 5
5. Troubleshooting ---------- 12
6. Service Notes ---------- 17
7. Wiring diagram ---------- 25
8. Disassembly diagram ---------- 30
9. Replacement parts list ---------- 32
10. RS-232C communication ---------- 33
11. Block diagram ---------- 40
12. Connector connection diagram ---------- 41
13. Circuit diagrams ---------- 42

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT.

Multimedia LCD Projector

November 2003 Digital Media Division

1. Features

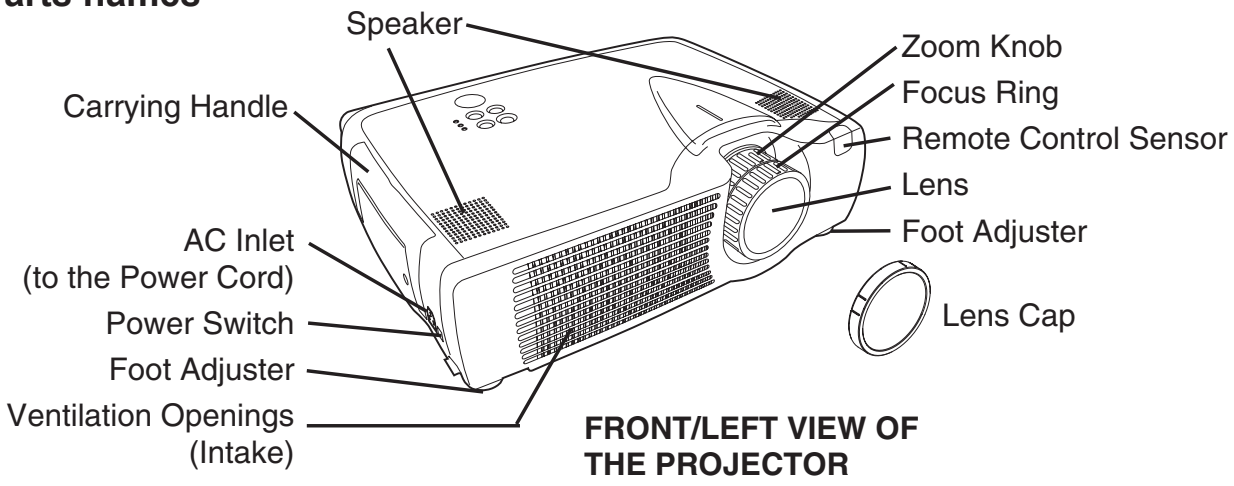
- High brightness, High resolution
- Compact size, light weight for portability
- RS-232C Communication
- Auto-adjustment function
- Vertical / Horizontal keystone function
- P. in P. function
- My screen function (User start up screen)

2. Specifications

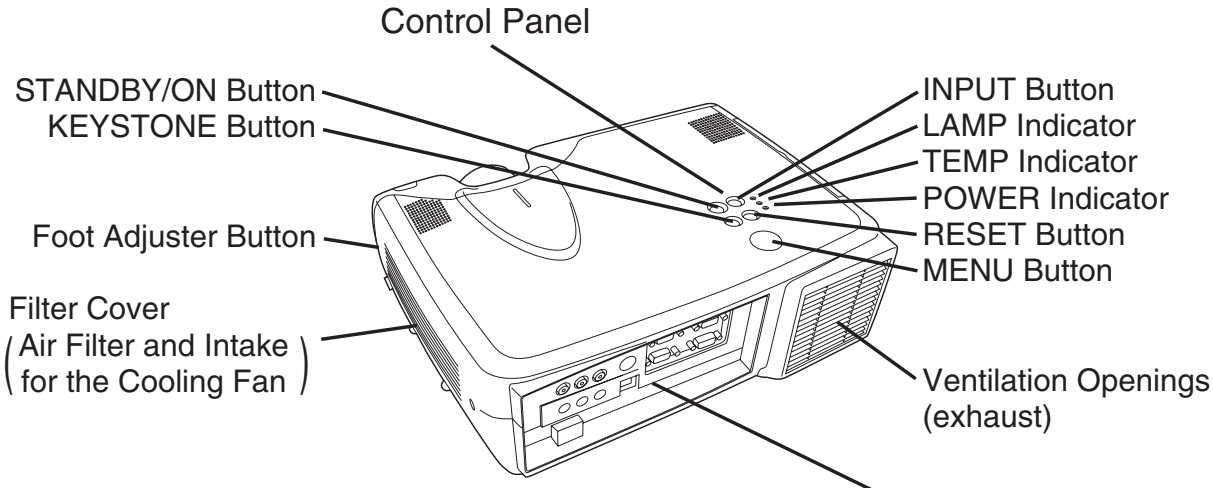
			CP-S420WA	CP-X430WA
Liquid crystal panel	Drive system		TFT active matrix	
	Panel size		2.3cm (0.9type)	
	Number of pixels		800 (H) × 600 (V)	1024 (H) × 768 (V)
Lamp			250W UHB	
RGB signal input	RGB IN	1	Video: Analog 0.7Vp-p, 75Ω terminator H/V. sync.: TTL level (positive/negative) Composite sync.: TTL level D-sub 15-pin shrink jack	
		2		
	Digital input (CP-X430WA only)	Signal	Type: T.M.D.S Amplitude differential signal: DC: 150~1200mV AC: 1.56Vp-p Amplitude signal: TTL level ("L" : less than 0.8V, "H" : more than 2.0V)	
	AUDIO IN	1	200mVrms, 47kΩ (max. 3.0Vp-p) Stereo mini jack	
		2		
Video signal input	VIDEO IN	System	NTSC, NTSC4.43, PAL (BGDHI), SECAM, PAL-M, PAL-N, PAL60	
			1.0Vp-p, 75Ω terminator RCA jack	
	S-VIDEO IN		Brightness signal: 1.0Vp-p, 75Ω terminator Colour signal: 0.286Vp-p NTSC, burst signal, 75Ω terminator 0.3Vp-p (PAL/SECAM, burst signal), 75Ω terminator Mini DIN 4-pin jack	
	COMPONENT VIDEO	System	480i, 480p, 575i, 720p, 1080i	
		Y	1.0Vp-p, 75Ω terminator (positive)	
		C_B/C_R	0.7Vp-p, 75Ω terminator (positive)	
		P_B/P_R	0.7Vp-p, 75Ω terminator (positive)	
	AUDIO IN	L	200mVrms, 50kΩ (max. 3.0Vp-p) RCA jack	
		R		
Signal output	RGB OUT		Video: Analog 0.7Vp-p, 75Ω output impedance (positive) H/V. sync.: TTL level (positive/negative) Composite sync.: TTL level D-sub 15-pin shrink jack	
	AUDIO OUT		200mVrms, output impedance 1kΩ (max. 3.0Vp-p) Stereo mini jack	
Audio input			200mVrms, 47kΩ	
Speaker output			1W +1W (stereo)	
Power supply			AC100~120V/4.5A, AC220~240V/1.9A	
Power consumption			410W	
Dimensions			360 (W) × 112.5 (H) × 266 (D) mm	
Weight			4.5kg (9.92lbs)	
Temperature range			Operation : 0~35°C Storage : -20~60°C	
Accessories			Remote control transmitter × 1 RGB cable × 1 Component cable × 1 Mouse cable (PS/2) × 1 POWER cord × 3	Battery × 2 Soft case × 1 Lens cap (set wearing) × 1 User's manual (with Safety Instructions)× 1

3. Unit Layout

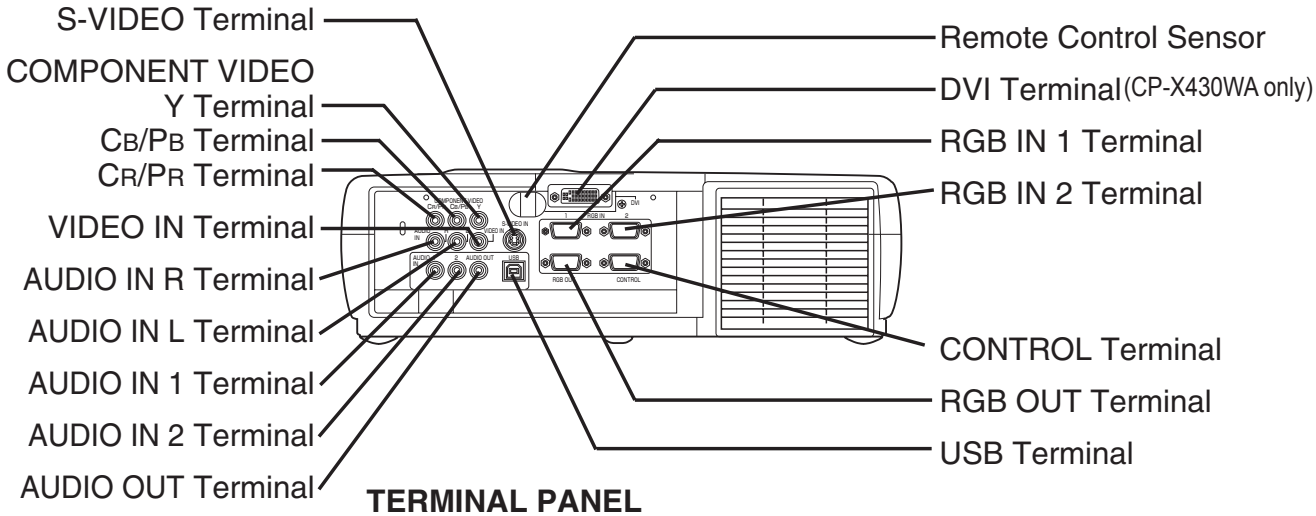
● Parts names



FRONT/LEFT VIEW OF THE PROJECTOR

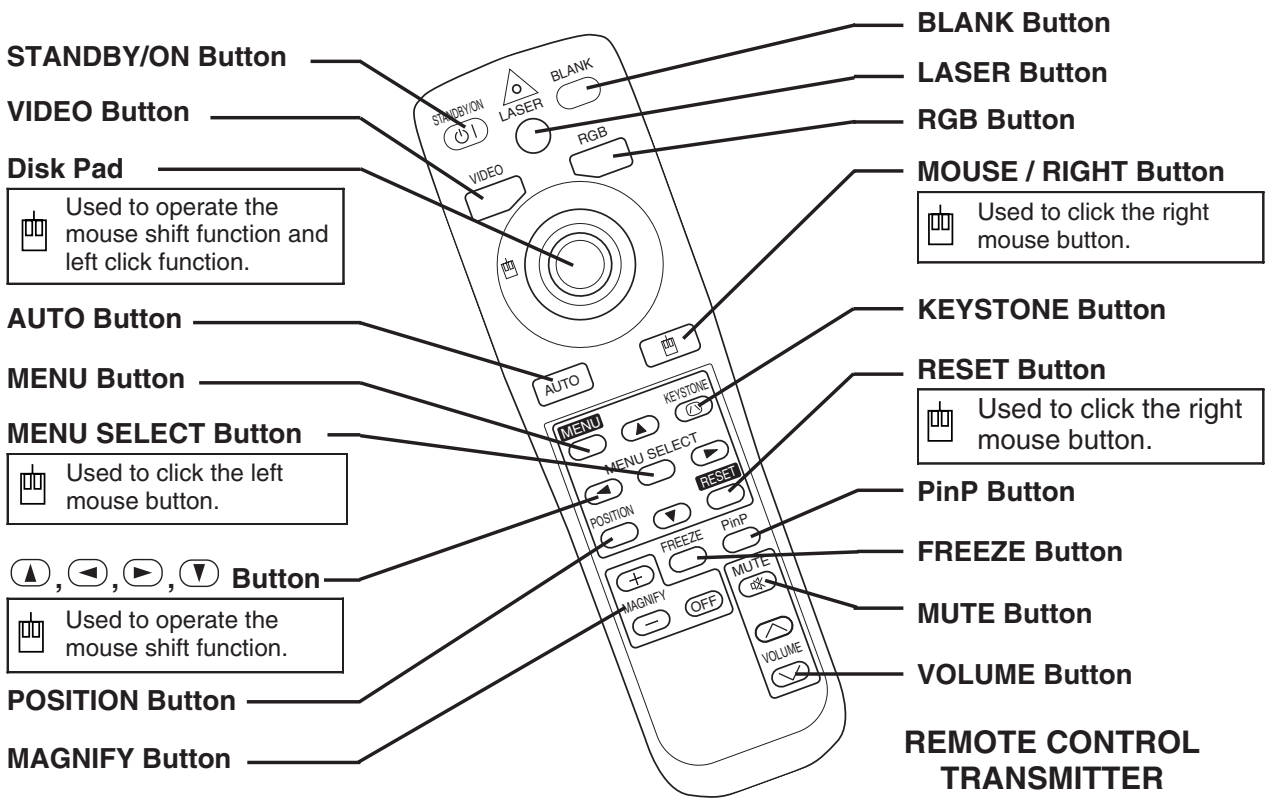


REAR/RIGHT VIEW OF THE PROJECTOR



TERMINAL PANEL

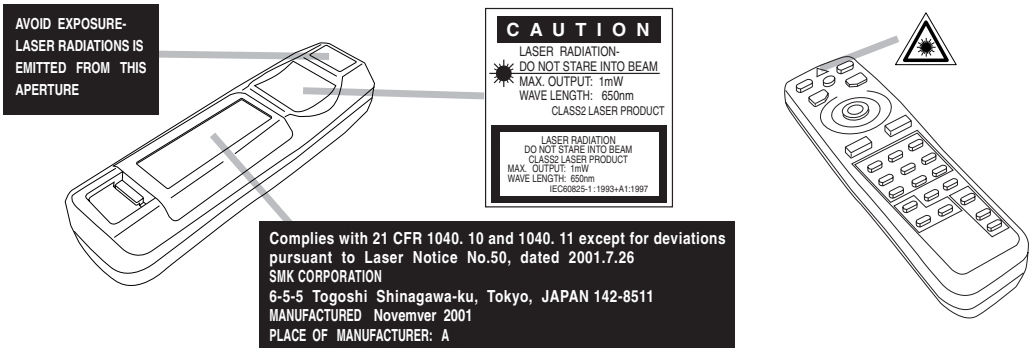
● Remote control transmitter



These functions works when the mouse control function is activated. Remember, the POSITION, BLANK ON and MENU ON functions disable the mouse control function.

WARNING • The laser pointer of the remote control transmitter is used in place of a finger or rod. Never look directly into the laser beam outlet or point the laser beam at other people. The laser beam can cause vision problems.

CAUTION • Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.



NOTE • Keep the remote control transmitter away from children and pets.
- Do not give the remote control transmitter any physical impact. Take care not to drop.
- Do not place the heavy objects on the remote control transmitter.
- Do not wet the remote control transmitter or place it on any wet object.
- Do not place the remote control transmitter close to the cooling fan of the projector.
- Do not disassemble the remote control transmitter.

4. Adjustment

4-1 Before adjusting

4-4-1 Selection of adjustment

When any parts in the table 4-1 are changed, choose the proper adjusting items with the chart.

Table 4-1: Relation between the replaced part and adjustment

Replaced part	Adjustment				
	Ghost (Chap.4-2)	Flicker (Chap.4-3)	NRSH (Chap.4-4)	White balance (Chap.4-5)	Colour uniformity (Chap.4-6)
Dichroic optics unit	○	○	×	△	△
LCD/LENS prism assembly	○	○	○	○	○
Drive PCB	○	○	○	○	○
Lamp unit assembly	△	△	×	△	△

○: means need for adjustment. ×: means not need for adjustment.

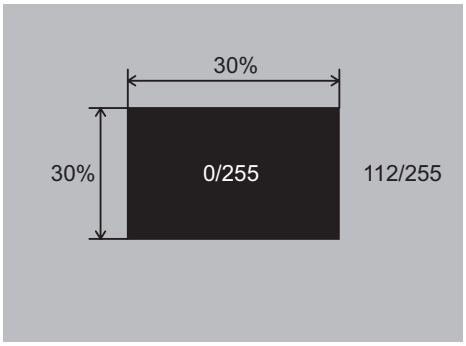
△: means recommended.

4-4-2 Setting of condition before adjustment

1. Before starting adjustment, warm up the projector for about 10 minutes. (Blank white)
2. Set Zoom Wide to Max. And project an image with more than 1m (40 inches) in diagonal size.
3. Normalisng the video adjustment.
   (Press the [MENU] button of the Remote control transmitter to display the Setup menu, and then press the [RESET] button. And select the [DEFAULT].)
   *note : The Setup menu is not displayed on with no signal.
4. Set the normal at WHISPER in the OPTION menu.
5. Set the normal at GAMMA in the IMAGE menu.
6. Perform all adjustments from the Adjustment menu.
   Perform the following operations to display the Adjustment menu.
   a. Press the [MENU] button of the Remote control transmitter (the Setup menu will appear).
   b. Next, press the [RESET] button one time. And press the [RESET] button again for 5 seconds or more (the Adjustment menu will appear).

4-2 Ghost adjustment

Signals for internal adjustment

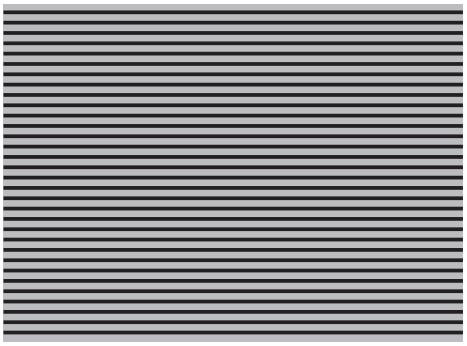


Adjustment procedure

1. Use DAC-P - GHOST - R: in the Adjustment menu to adjust so that R colour ghost is at a minimum.
   (Set the adjustment value to default, and then raise the value. When a light ghost appears to the left of a vertical line, reduce the value by 1 step (CP-X430WA) or 2 steps (CP-S420WA). When a dark ghost appears to the left of a vertical line, reduce the value by 2 steps (CP-X430WA) or 3 steps (CP-S420WA).)
2. In the same way, use DAC-P - GHOST-G: in the Adjustment menu to adjust so that G colour ghost is at a minimum.
3. In the same way, use DAC-P - GHOST-B: in the Adjustment menu to adjust so that B colour ghost is at a minimum.

4-3 Flicker adjustment (V.COM adjustment)

Signals for internal adjustment

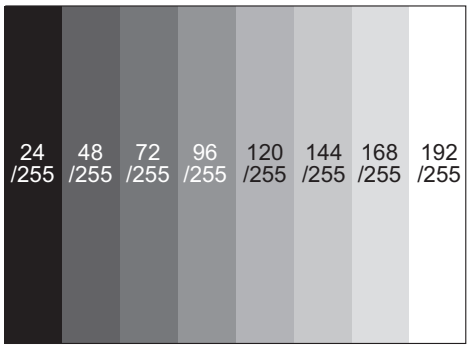


Adjustment procedure

1. Make this adjustment after completing the adjustment in 4-2 Ghost adjustment.
2. Use DAC-P - V.COM - R: in the Adjustment menu to adjust so that the flicker at the centre of the screen is less than the flicker at the periphery.
   (When the flicker is about the same across the whole screen, adjust so that the flicker at the centre of the screen is somewhat less than elsewhere.)
3. In the same way, use DAC-P - V.COM-G: in the Adjustment menu to adjust the G colour flicker.
4. In the same way, use DAC-P - V.COM-B: in the Adjustment menu to adjust the B colour flicker.

4-4 NRSH adjustment (vertical stripe adjustment)

Signals for internal adjustment



Adjustment procedure

1. Make this adjustment after completing the adjustment in 4-3 Flicker adjustment.
2. Use DAC-P - NRSH - R: in the Adjustment menu to adjust so that the vertical lines spaced every 6 dots are as inconspicuous as possible.
   (Reduce the adjustment value when black stripes appear in the 2nd or 3rd tone from the black side. Note that when the adjustment value is lowered, white stripes may appear in the 2nd or 3rd tone from the bright side. Should this happen, adjust so that the stripes are as inconspicuous as possible.)
3. In the same way, use DAC-P - NRSH - G: in the Adjustment menu to adjust vertical stripes of G colour.
4. In the same way, use DAC-P - NRSH - B: in the Adjustment menu to adjust vertical stripes of B colour.

4-5 White balance adjustment (visual inspection)

Preparations

1. Perform these adjustments after the NRSH adjustment described in Section 4-4.
2. Reset gamma correction before adjustment.
   - Place the cursor on [GAMMA] in the Adjustment menu, press the [RESET] key and select [DEFAULT].

Adjustment procedure

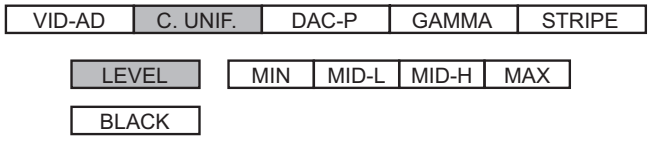
1. First, adjust the G colour.
2. Select GAMMA, SUB-CONTRAST, and G: in the Adjust menu. If the background is white solid, press the [MENU SELECT] key on the Remote control transmitter to change to [G] monochrome in the 28-tone grayscale.
3. Adjust GAMMA, SUB-CONTRAST, and G: in the Adjust menu so that brightness of 28 steps is best.
4. Don't adjust GAMMA, SUB-BRIGHT, and G: in the Adjust menu. Because we want to keep the best contrast ratio.
5. Then adjust colours R and B.
6. Select GAMMA, SUB-CONTRAST, and G: in the Adjust menu. If the background is white solid, press the [MENU SELECT] key on the Remote control trasmitter to change to [W] monochrome in the 28-tone grayscale.
7. Adjust GAMMA, SUB-BRIGHT, R: and B: in the Adjust menu so that low-brigtness white balance is best.
8. Adjust GAMMA, SUB-CONTRAST, R: and B: in the Adjust menu so that middle-brightness white balance is best.
9. Repeat steps 7 to 8 above, and adjust so that brightness white balance of 28 steps is best.

4-6 Colour uniformity adjustment

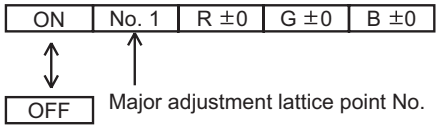
Preparations

1. Perform these adjustments after the white balance adjustment described in Section 4-5.
2. Make a colour uniformity adjustment for the following four tones.
   - MIN tone (approx. 3% input signal)
   - MID-L tone (approx. 13% input signal)
   - MID-H tone (approx. 22% input signal)
   - MAX tone (approx. 50% input signal)
3. Place the cursor on the tone to be adjusted in the Adjust menu and press the [▼] key. This displays the Adjust Tone menu at the bottom of the screen. Select the major adjustment lattice point No. and color, and then adjust them.
4. The major adjustment lattice point numbers (a total of 17 points) corresponds to the major adjustment lattice point positions in the diagram on the right. The colour uniformity of the entire screen can be adjusted by adjusting the white balance for each of the points starting in order from the low numbers.
5. Adjustment point No.1 should not be adjusted, because it controls the brightness of the entire screen.
6. To temporarily turn correction off, place the cursor on “ON” in the Adjust Tone menu and press the [▼] key. To turn it on again, place the cursor on OFF in the Adjust Tone menu and press the [▲] key.
7. Although this adjustment can also be made using internal signals, we will here use the [MENU SELECT] key on the Remote control transmitter to select the following two signals.
   - Solid monochrome adjustment colour (use G colour adjustment when a colour differential meter is used).
   - Solid white (use for adjustment other than above).
8. Reset color-shading correction before adjustment.
   - When 4 tones and all colours are to be reset, place the cursor on [C.UNIF.] in the Adjustment menu, press the [RESET] key and select [DEFAULT].
   - When only 1 tone is to be reset, place the cursor on the tone to be reset, press the [RESET] key and select [DEFAULT].
   - Single tone and monochrome resets cannot be performed.

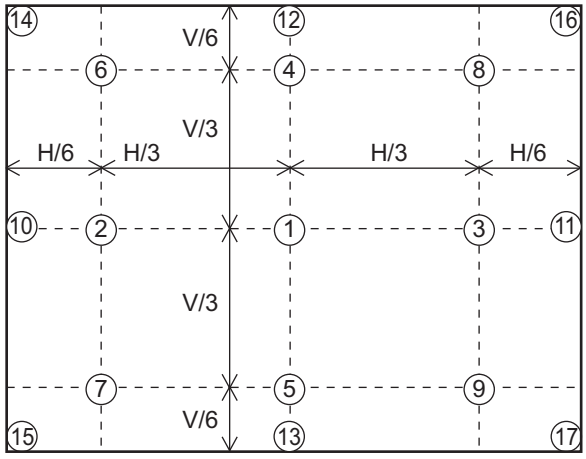
Adjust menu



Adjust Tone menu



Major adjustment lattice point position



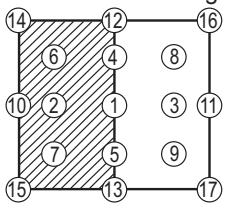
Adjustment procedure 1
(when a colour differential meter is used)

1. First adjust [MID-L] tone [G:].
2. Select adjustment point [No.2][G:].
   When the background is not [G] monochrome, press the [MENU SELECT] key on the Remote control transmitter to change to solid [G] monochrome.
3. Measure the illumination at adjustment points No. 2, No.3, No.10 and No.11.
   The values should be:
   No.2 = Y2 [lx] No.10 = Y10 [lx]
   No.3 = Y3 [lx] No.11 = Y11 [lx]
4. No.2 and No.3 adjustment point have the average of Y2 and Y3.
   Y2 = (Y2 + Y3) / 2 ± 2 [%]
   Y3 = (Y2 + Y3) / 2 ± 2 [%]
5. No.10 and No.11 adjustment point have the average of Y10 and Y11.
   Y10 = (Y10 + Y11) / 2 ± 2 [%]
   Y11 = (Y10 + Y11) / 2 ± 2 [%]
6. Then adjust [MID-L] tone [R] and [B].
   When the background is [G] monochrome, press the [MENU SELECT] key on the Remote control transmitter to change to solid white.
7. Measure the colour coordinates of adjustment point [No.1] and make a note of them.
   Assume that they are x = x1, y = y1.
   Note: When the CL-100 colour and colour difference meter is used, the [△](delta) mode is convenient. When adjustment point [No.1] colour coordinate has been selected, set the slide switch on the side to [△] (delta) while holding down the [F] button on the front panel. The measurement shown after this displays the deviation from measurement point 1.
8. Measure the colour coordinates of measurement point [No.2] and adjust [No.2][R:] and [B:] so that the coordinates are as follows.
   x = x1 ± 0.005 , y = y1 ± 0.005
9. Similarly, measure adjustment points [No.3] to [No.17] and adjust their colour coordinates starting in order from the small number points.
   This completes adjustments required for [MIN].
   Note: Since excessive correction may lead to a correction data overview during internal calculations, use the following values for reference.
   [No.2] to [No.5] ± 40 or less
   [No.6] to [No.9] ± 50 or less
   [No.10] to [No.13] ± 70 or less
   [No.14] to [No.17] ± 120 or less
10. Then adjust [MIN] tone [G] so that the adjustment data set three times as much as [MID-L] tone [G].
    This completes [G] colour adjustments.
11. Then adjust [MIN] tone [R] and [B].
    Select [No.2] [B:] and press the [MENU SELECT] key on the Remote control transmitter to change to solid white.
12. Measure the colour coordinates of adjustment point [No.1] and make a note of them.
    Assume that they are x = x1, y = y1.
13. Now measure the colour coordinates of measurement point [No.2] and adjust [No.2][R:] and [B:] so that the coordinates are as follows.
    x = x1 ± 0.005 , y = y1 ± 0.010 (Target)
    x = x1 ± 0.020 , y = y1 ± 0.040
14. Similarly, measure adjustment points [No.3] to [No.17] and adjust their colour coordinates starting in order from the small number points.
    This completes [MIN] tone adjustments.
15. Now make similar adjustments for [MID-H] tone.
    (Adjust [MID-H] tone [G] so that the adjustment data set half as many as [MID-L] tone [G].)
16. Now make similar adjustments for [MAX] tone.
    (Adjust [MAX] tone [G] so that the adjustment data set half as many as [MID-L] tone [G].)

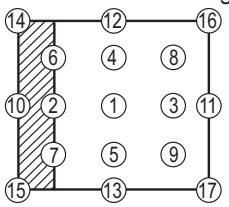
Adjustment procedure 2
(visual inspection)

1. First adjust [MIN] tone [G:].
2. Select [No.2] [G:].
   If the background is [G] monochrome, press the [MENU SELECT] key on the Remote control transmitter to change to solid white.
3. View measurement point [No.2] and [No.3].
   Lower the [G] colour intensity only of the color point whose [G] colour is more intense than measurement point [No.1].
4. View measurement point [No.10] and [No.11].
   Lower the [G] colour intensity only of the colour point whose [G] colour is more intense than measurement point [No.1], and raise the intensity of the point whose colour intensity is lower than measurement point [No.1].
5. Now adjust the [MIN] tone for colours [R] and [B].
6. View measurement points [No.2], [No.3], [No.10] and [No.11]. Adjust the [R] and [B] of each measurement point so that they have the same colour as measurement point [No.1].
   Adjustment technique:
   First, adjust [B:] of the point whose colour is to be adjusted so that it approximates that of [No.1]. If [R:] is low at this time, the image will have cyan cast, in which case [R:] is increased. On the other hand, if [R:] is excessive, the image will have a magenta cast, in which case [R:] is decreased.
   Overall, a cyan cast makes it easy to see colour shading.
7. Next, view measurement points [No.4], [No.5], [No.12], [No.13] and make similar adjustments.
8. Then adjust measurement points [No.6], [No.7], [No.8], [No.9], [No.14], [No.15], [No.16] and [No.17].
   This completes the [MIN] tone adjustments.
9. Make similar another three tones as described in steps 1 to 8 above.

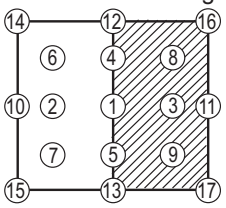
No. 2 deviation range



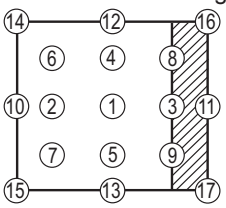
No. 10 deviation range



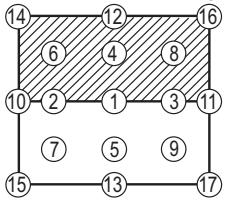
No. 3 deviation range



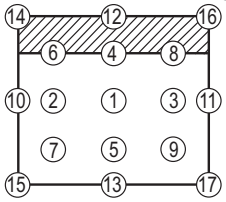
No. 11 deviation range



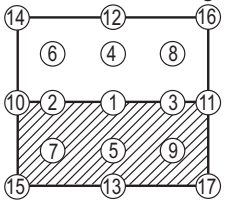
No. 4 deviation range



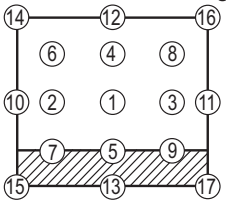
No. 12 deviation range



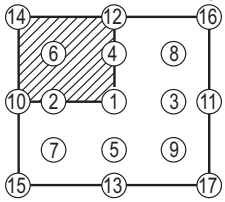
No. 5 deviation range



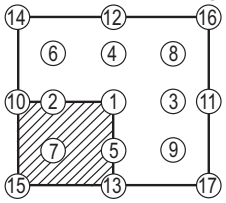
No. 13 deviation range



No. 6 deviation range



No. 7 deviation range



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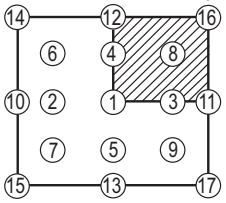
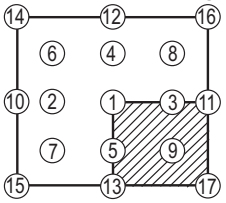
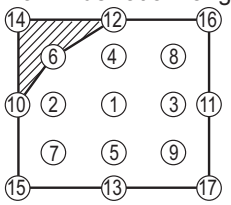


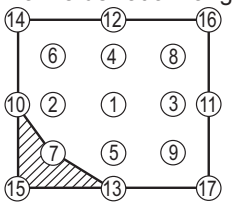
No. 9 deviation range



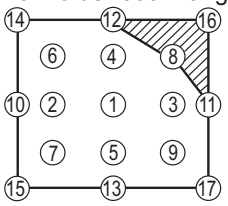
No. 14 deviation range



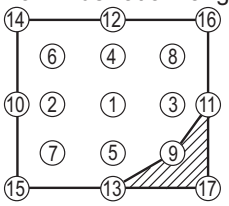
No. 15 deviation range



No. 16 deviation range

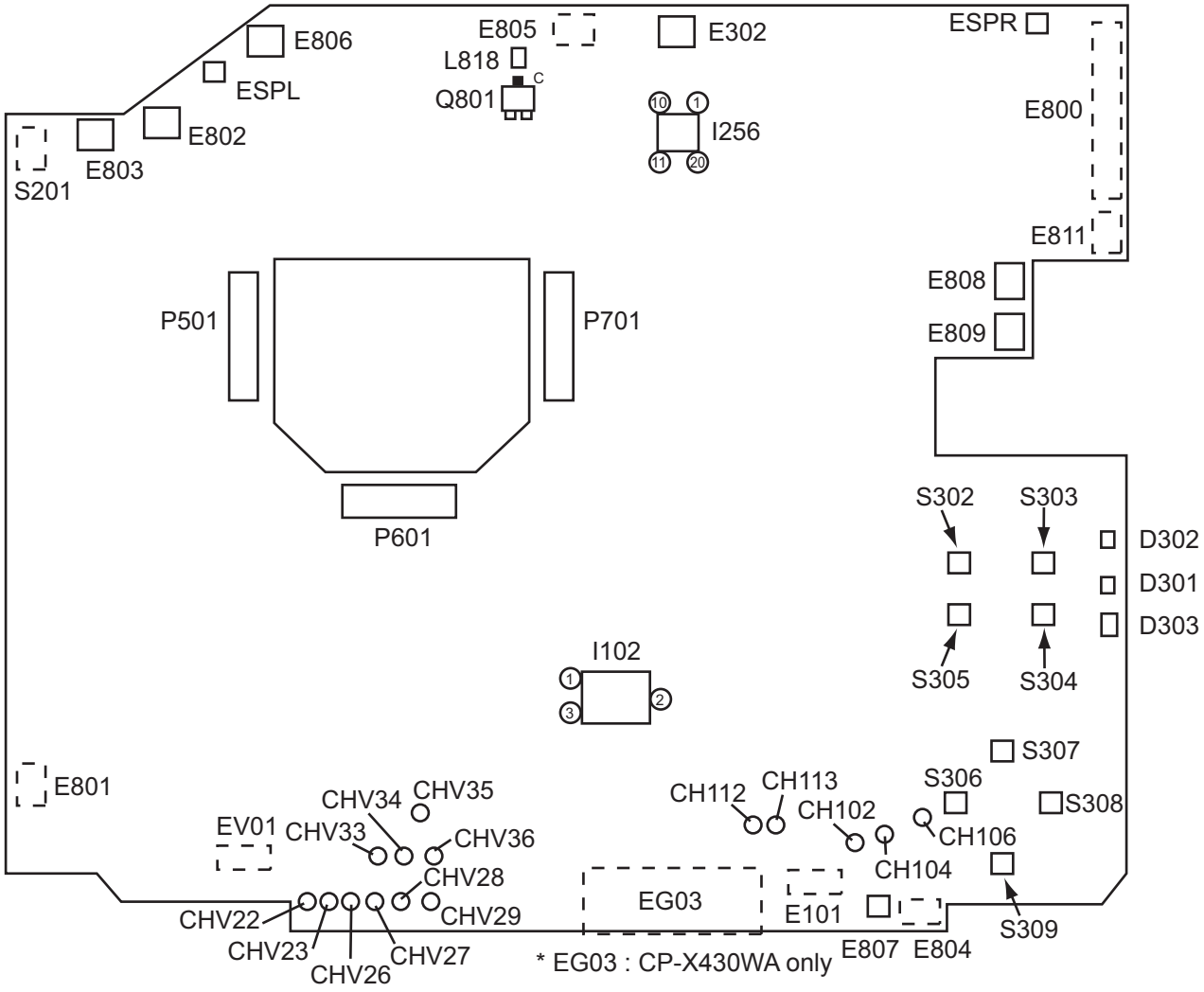


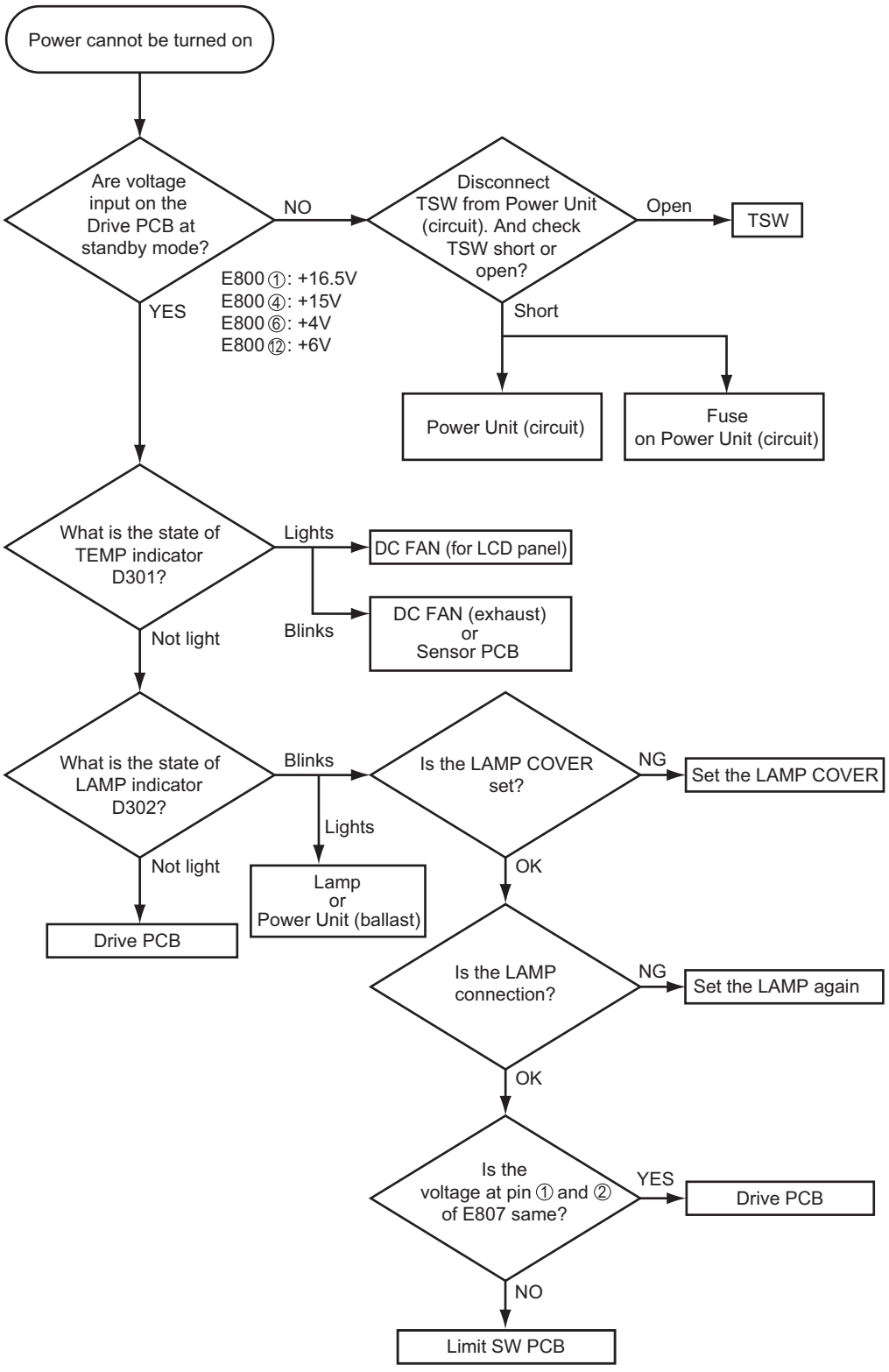
No. 17 deviation range

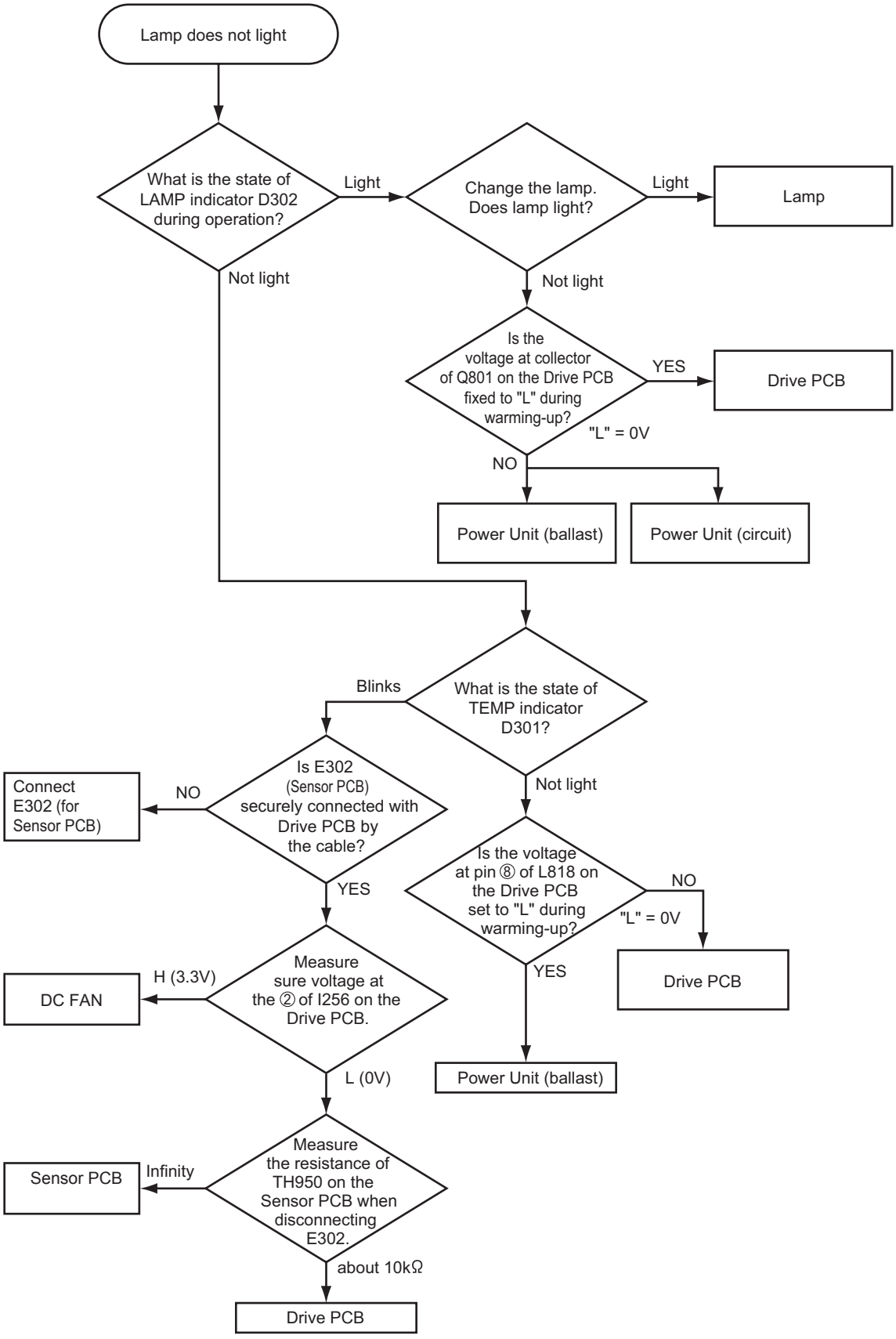


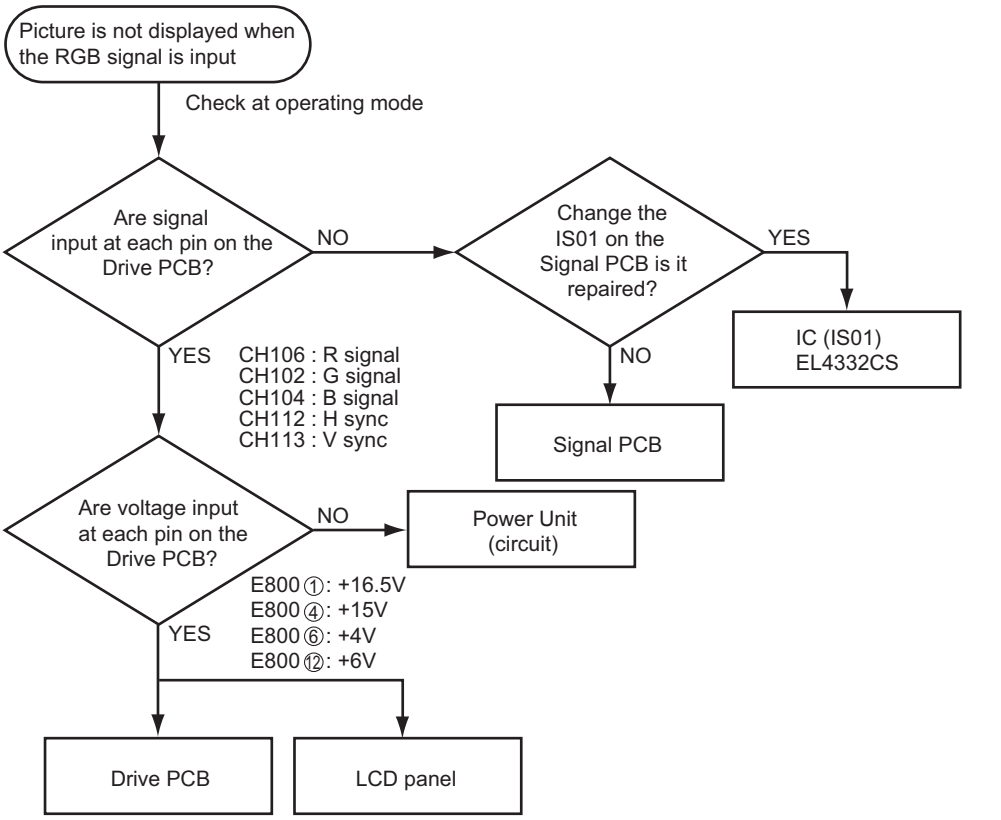
5. Troubleshooting

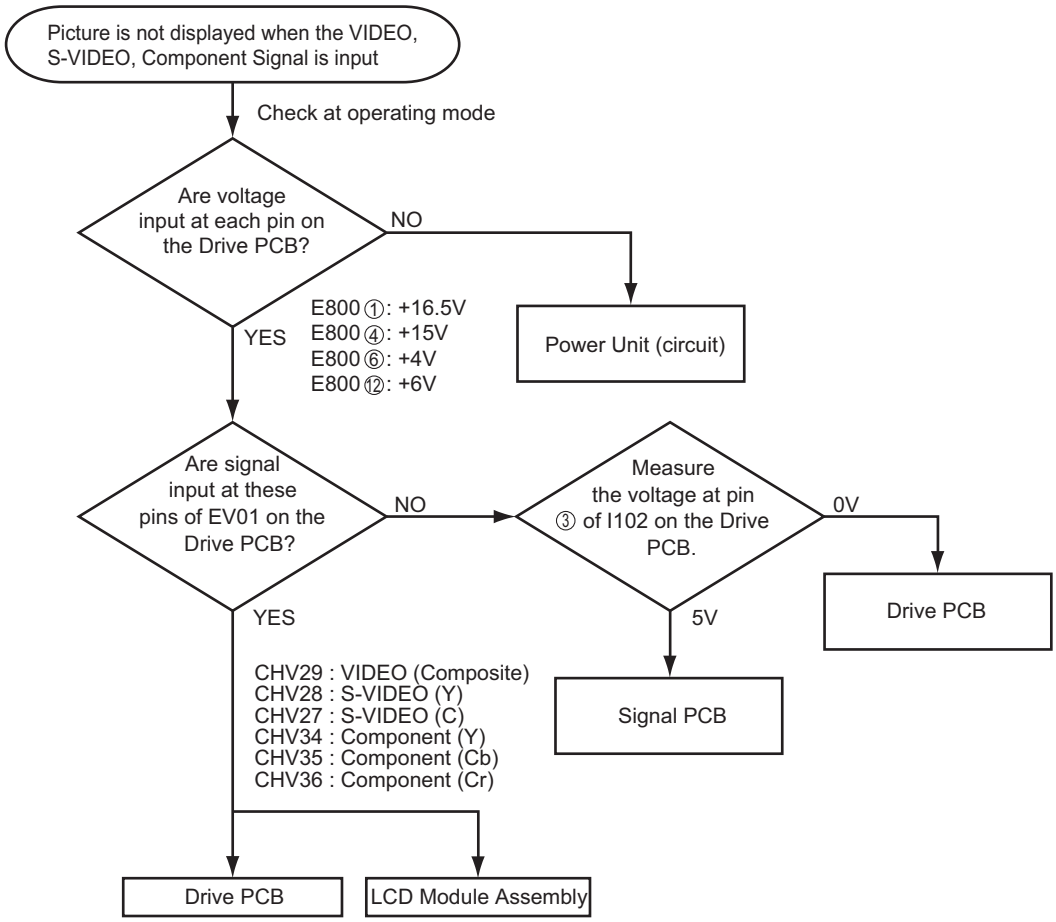
Check points at trouble shooting

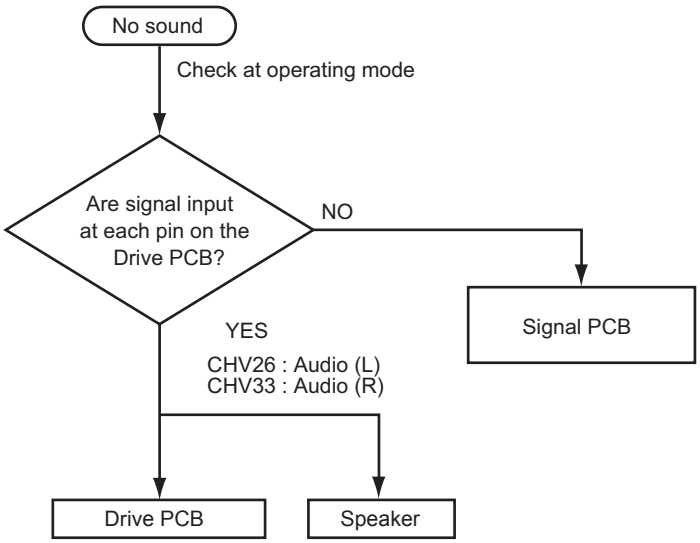


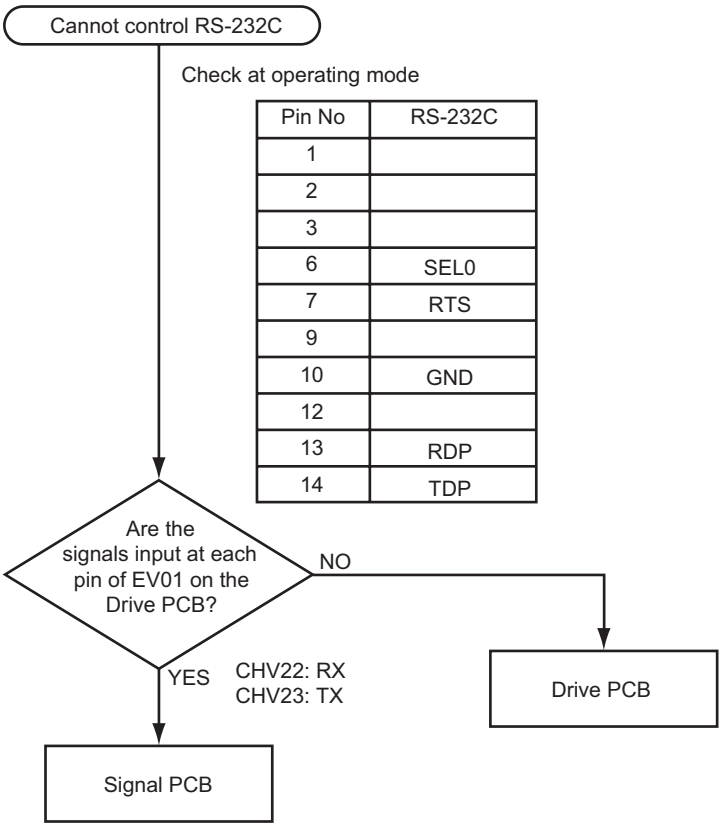

Power cannot be turned on
Are voltage input on the Drive PCB at standby mode?
NO
Disconnect TSW from Power Unit (circuit). And check TSW short or open?
Open
TSW
Short
Power Unit (circuit)
Fuse on Power Unit (circuit)
E800 ①: +16.5V
E800 ④: +15V
E800 ⑥: +4V
E800 ⑫: +6V
YES
What is the state of TEMP indicator D301?
Lights
DC FAN (for LCD panel)
Blinks
DC FAN (exhaust) or Sensor PCB
Not light
What is the state of LAMP indicator D302?
Blinks
Is the LAMP COVER set?
NG
Set the LAMP COVER
Lights
Lamp or Power Unit (ballast)
Not light
Drive PCB
OK
Is the LAMP connection?
NG
Set the LAMP again
OK
Is the voltage at pin ① and ② of E807 same?
YES
Drive PCB
NO
Limit SW PCB


Lamp does not light
What is the state of LAMP indicator D302 during operation?
Light
Change the lamp. Does lamp light?
Light
Lamp
Not light
Not light
Is the voltage at collector of Q801 on the Drive PCB fixed to "L" during warming-up?
YES
Drive PCB
"L" = 0V
NO
Power Unit (ballast)
Power Unit (circuit)
What is the state of TEMP indicator D301?
Blinks
Not light
Is E302 (Sensor PCB) securely connected with Drive PCB by the cable?
NO
Connect E302 (for Sensor PCB)
YES
Is the voltage at pin ⑧ of L818 on the Drive PCB set to "L" during warming-up?
NO
"L" = 0V
Drive PCB
YES
Measure sure voltage at the ② of I256 on the Drive PCB.
H (3.3V)
DC FAN
L (0V)
Power Unit (ballast)
Measure the resistance of TH950 on the Sensor PCB when disconnecting E302.
Infinity
Sensor PCB
about 10kΩ
Drive PCB


Picture is not displayed when the RGB signal is input
Check at operating mode
Are signal input at each pin on the Drive PCB?
NO
Change the IS01 on the Signal PCB is it repaired?
YES
IC (IS01) EL4332CS
NO
Signal PCB
YES
CH106 : R signal
CH102 : G signal
CH104 : B signal
CH112 : H sync
CH113 : V sync
Are voltage input at each pin on the Drive PCB?
NO
Power Unit (circuit)
E800 ①: +16.5V
E800 ④: +15V
E800 ⑥: +4V
E800 ⑫: +6V
YES
Drive PCB
LCD panel


Picture is not displayed when the VIDEO, S-VIDEO, Component Signal is input
Check at operating mode
Are voltage input at each pin on the Drive PCB?
NO
Power Unit (circuit)
E800 ①: +16.5V
E800 ④: +15V
E800 ⑥: +4V
E800 ⑫: +6V
YES
Are signal input at these pins of EV01 on the Drive PCB?
NO
Measure the voltage at pin ③ of I102 on the Drive PCB.
0V
Drive PCB
5V
Signal PCB
YES
CHV29 : VIDEO (Composite)
CHV28 : S-VIDEO (Y)
CHV27 : S-VIDEO (C)
CHV34 : Component (Y)
CHV35 : Component (Cb)
CHV36 : Component (Cr)
Drive PCB
LCD Module Assembly





Pin No	RS-232C
1	
2	
3	
6	SEL0
7	RTS
9	
10	GND
12	
13	RDP
14	TDP

6. Service Notes

6-1 Lead free solder [CAUTION]

This product uses lead free solder (unleaded) to help preserve the environment. Please read these instructions before attempting any soldering work.

Caution: Always wear safety glasses to prevent fumes or molten solder from getting into the eyes. Lead free solder can splatter at high temperatures (600˚C).

■ Lead free solder indicator

Printed circuit boards using lead free solder are engraved with an "F."

■ Properties of lead free solder

The melting point of lead free solder is 40-50˚C higher than leaded solder.

■ Servicing solder

Solder with an alloy composition of Sn-3.0Ag-0.5Cu or Sn-0.7Cu is recommended.
Although servicing with leaded solder is possible, there are a few precautions that have to be taken. (Not taking these precautions may cause the solder to not harden properly, and lead to consequent malfunctions.)

Precautions when using leaded solder

- Remove all lead free solder from soldered joints when replacing components.
- If leaded solder should be added to existing lead free joints, mix in the leaded solder thoroughly after the lead free solder has been completely melted (do not apply the soldering iron without solder).

■ Servicing soldering iron

A soldering iron with a temperature setting capability (temperature control function) is recommended.
The melting point of lead free solder is higher than leaded solder. Use a soldering iron that maintains a high stable temperature (large heat capacity), and that allows temperature adjustment according to the part being serviced, to avoid poor servicing performance.

Recommended soldering iron:

- Soldering iron with temperature control function (temperature range: 320-450˚C)

Recommended temperature range per part:

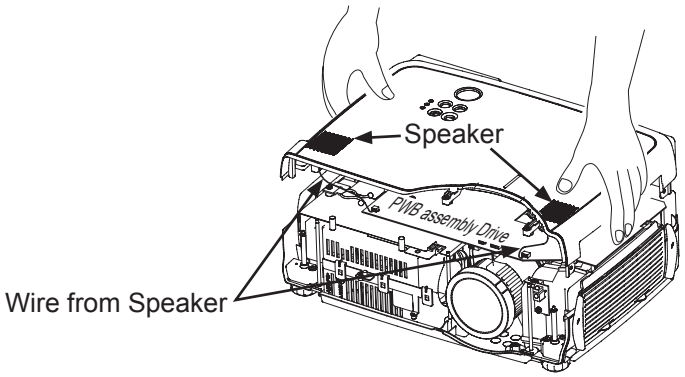
Part	Soldering iron temperature
Mounting (chips) on mounted PCB	320˚C±30˚C
Mounting (chips) on empty PCB	380˚C±30˚C
Chassis, metallic shield, etc.	420˚C±30˚C

The PCB assemblies which use lead free solder

① DRIVE PCB
② REMOTE PCB

6-2 Removing the Upper case assembly

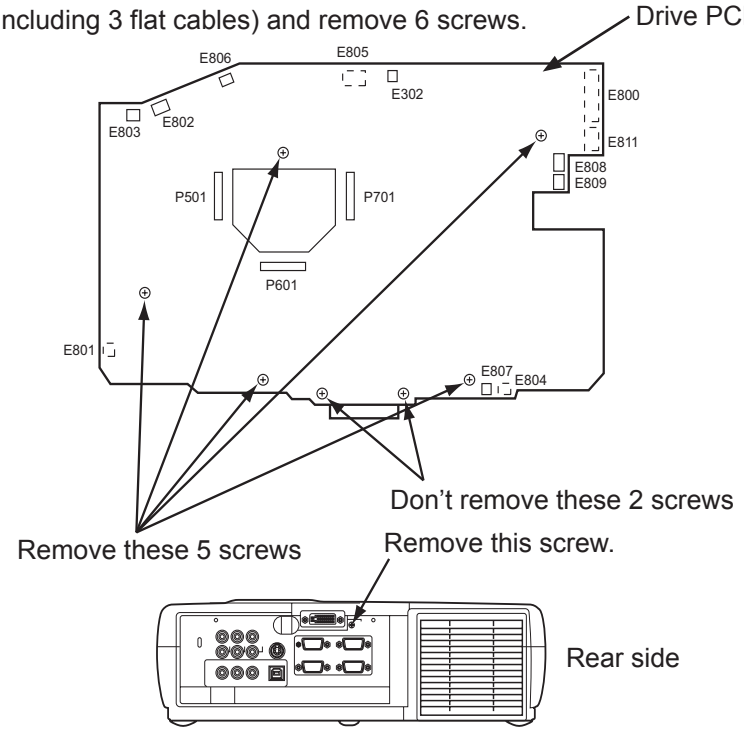
When you remove the Upper case assembly, avoid to damage wires between speakers on the Upper case assembly and Drive PCB on the Bottom case assembly.



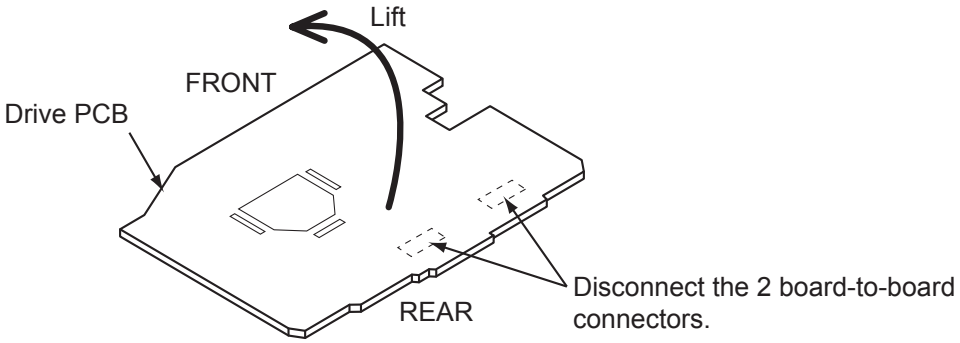
6-3 Removing the Drive PCB

When removing the Drive PCB, there is a danger of damaging the connectors, connecting cables and the Signal PCB.

1) Disconnect 15 cables (including 3 flat cables) and remove 6 screws.



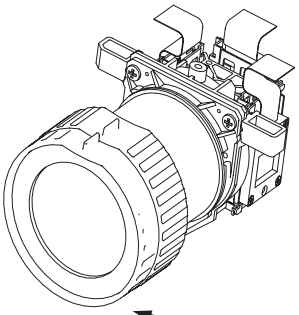
2) Lift the Drive PCB.



6-4 Before Replacing the LCD / Lens Prism

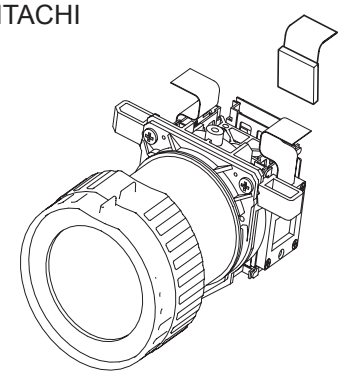
You should not replace the parts of the liquid crystal LCD / Lens Prism separately because they work properly only when used together. Therefore, you can either replace part or or send the whole unit LCD / Lens Prism assembly back to HITACHI, where we will replace the malfunctioning part, recondition the device and send it back.
Please contact our distributor.

DISTRIBUTOR



- Do not disassemble the unit because replacement of separate parts is not possible.
- For repairs of the product, please contact our distributor.

HITACHI G Panel



Replacement of G Panel → Reconditioning

Return

6-5 Air Filter

Cleaning the Air filter

The air filter should be cleaned as described below at intervals of approximately 100 hours.

1. Switch the projector power supply OFF, and remove the power cord from the power outlet.
2. Clean the air filter with a vacuum cleaner.

Replacing the Air filter

Replace the air filter if contamination cannot be removed, or if it is damaged.

1. Remove the filter cover.
2. Remove the old filter.
3. Set the new filter and filter cover.

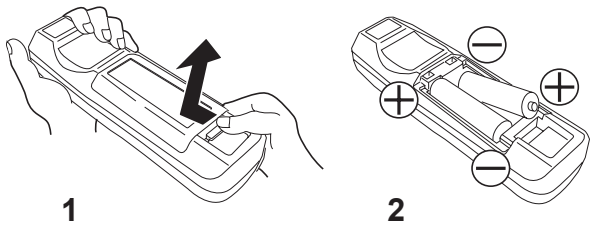
CAUTION

- Switch power OFF and remove the power cord from the power outlet before beginning maintenance work. Please read the separate “SAFETY INSTRUCTIONS” thoroughly to ensure that maintenance is performed correctly.
- Replace the air filter if contamination cannot be removed, or if it is damaged. Contact your dealer in such case.(Option Air filter assembly : Parts No. NJ06131)
- Do not use the equipment with the air filter removed.
- When the air filter is clogged with dust etc. the power supply is switched OFF automatically to prevent the temperature rising inside the projector.

6-6 Loading the Batteries

Install the AA batteries into the remote control transmitter.

1. Remove the battery cover.
   Push the knob while lifting up the battery cover.
2. Loading the batteries.
   Make sure the plus and minus poles are correctly oriented.
3. Close the battery cover.



CAUTION

- Use only the specified batteries with this remote control transmitter. Also, do not mix new and old batteries. This could cause in battery cracking or leakage, which could result in fire or personal injury.
- When loading the batteries, make sure the plus and minus terminals are correctly oriented as indicated in the Remote control transmitter. Incorrect orientation could cause battery cracking or leakage, which could result in personal injury or pollution of the surrounding environment.
- When you dispose the battery, you should obey the law in the relative area or country.
- Keep the battery away from children and pets.
- When not to be used for an extended period, remove the batteries from the Remote control transmitter.

NOTE: Replace the batteries when remote control transmitter operation becomes difficult.

6-7 Lamp (Option Lamp: DT00471)

HIGH VOLTAGE
HIGH TEMPERATURE
HIGH PRESSURE

Before replacing the lamp, switch power OFF, remove the power cord from the power outlet, and wait 45 minutes until the lamp has cooled. The lamp may explode if handled at high temperatures.

WARNING

- A mercury lamp used in this LCD projector is made of glass and has high internal pressure. The mercury lamp can burst with a big noise due to deterioration resulting from a shock, crack and passage of time, and can end its service life in unlit condition. Lamps also have a considerably different service life and can sometimes end up in burst or turn to unlit condition soon after use. Furthermore, when the lamp is blown up, glass fragments can get scattered around the lamp house and some gas containing mercury inside the lamp can leak out of the projector's air vent.
- Handle the lamp with utmost care as it can burst during use if subjected to a shock or impact or if scratched or cracked.
- Probability for the burst will increase if the lamp is used for extended period of time or used exceeding the period of replacement. Avoid any reuse of an old lamp (used lamp) since such reuse can result in burst.
- In case the lamp gets blown up in a short period of time after use, some electrical failures or troubles other than the lamp itself may be suspected as causes.
- Should the lamp burst (accompanied by a big bursting noise), perform ventilation sufficiently, and exercise maximum caution not to inhale any gas out of the projector's air vent or not to let it enter your eyes or mouth.
- Should the lamp burst (accompanied by a big bursting noise), make absolutely sure to unplug the power cord from the outlet and ask the store where you bought the lamp for immediate replacement.
- When you dispose of any used lamps, be sure to observe and follow local ordinances and regulations of the area or district where they are subjected to disposal. Generally speaking, the lamps are treated similarly as glasses and bottles in most cases, but there are areas or districts where lamps are classified as a separate collection, and so be sure to use caution.
- Never use the lamp in a state where the lamp cover is removed.

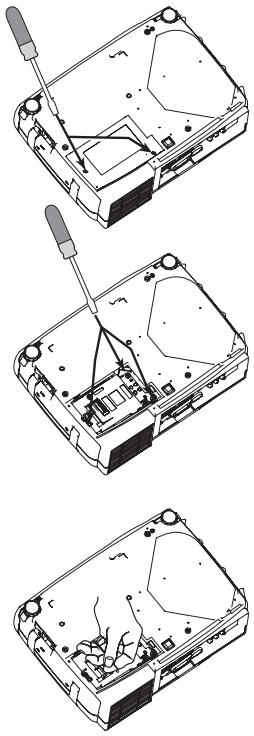
Lamp Life

Projector lamps have a finite life. The image will become darker, and hues will become weaker, after a lamp has been used for a long period of time.
Replace the lamp if the LAMP indicator is red, or the CHANGE THE LAMP message appears when the projector is switched ON.

NOTE: The LAMP indicator is also red when the lamp unit reaches high temperature. Before replacing the lamp, switch power OFF, wait approximately 20 minutes, and switch power ON again.
If the LAMP indicator is still red, replace the lamp.

Replacing the Lamp

1. Switch the projector OFF, remove the power cord from the power outlet, and wait at least 45 minutes for the unit to cool.
2. Prepare a new lamp.
3. Check that the projector has cooled sufficiently, and gently turn it upside down.
4. Loosen the two screws as shown in the diagram, and remove the lamp cover.
5. Loosen the three screws, and gently remove the lamp while holding the grips. Touching the inside of the lamp case may result in uneven coloring.
6. Install the new lamp and tighten the three screws firmly.
   Also steadily push the opposite side of the screwed lamp into the unit.
7. Replace the lamp cover in position and tighten the two screws firmly.
8. Gently turn the projector right-side up.



CAUTION

- Ensure that screws are tightened properly. Screws not tightened fully may result in injury or accidents.
- Do not use the projector with the lamp cover removed.

Resetting the Lamp Timer

Reset the lamp timer after replacing the lamp. When the lamp has been replaced after the LAMP indicator is red, or the CHANGE THE LAMP message is displayed, complete the following operation within ten minutes of switching power ON. The power will be turned off automatically in over 10 minutes.

1. Switch power ON, and press the RESET button, for approximately three seconds. The ‘LAMP xxxx hr’ message will appear on the lamp timer on the bottom of the screen.
2. Press the MENU button on the remote control transmitter, or the RESET button on the control panel, while the lamp timer is displayed. The ‘LAMP xxxx □ → 0 ■ CANCEL’ message will then appear.
3. Press the ◄ and select 0, and wait until the timer display is cleared.

NOTE: Do not reset the lamp timer without replacing the lamp. Reset the lamp timer always when replacing the lamp. The message functions will not operate properly if the lamp timer is not reset correctly.

6-8 OSD Message

The messages as described below may appear on the screen at power ON. Take the appropriate measures when such messages appears.

Message	Contents
CHANGE THE LAMP AFTER REPLACING LAMP, RESET THE LAMP TIME. (*1)	The usage time of lamp will be reaching 2000 hr shortly.(*2) It is recommended to replace the lamp soon. Prepare a new lamp as a replacement.
CHANGE THE LAMP AFTER REPLACING LAMP, RESET THE LAMP TIME. THE POWER WILL TURN OFF AFTER ** hr. (*1)	The usage time of lamp will be reaching 2000 hr shortly. It is recommended to replace the lamp within * * hours.(*2) It might be happened that the lamp is cut off before * * hr by any chance. Power will be switched OFF automatically in * * hours. Replace the lamp as shown in "Lamp". Always reset the lamp timer after replacing the lamp.
CHANGE THE LAMP AFTER REPLACING LAMP, RESET THE LAMP TIME. THE POWER WILL TURN OFF AFTER 0 hr.	The usage time of lamp is about to reach. Power will be switched OFF in a few minutes.(*2) Switch power OFF immediately and replace the lamp as shown in "Lamp". Always reset the lamp timer after replacing the lamp.
NO INPUT IS DETECTED ON ***	No input signal found. Check signal input connections and signal sources.
SYNC IS OUT OF RANGE ON ***	The horizontal or vertical frequency of the input signal is not within the specified range. Check the specifications of the equipment and the signal source.
CHECK THE AIR FLOW	Please remove the obstruction before the suction port.

NOTE (*1) This message is cleared automatically after approximately three minutes, and appears every time power is switched ON.
(*2) The unit has a function to turn the power off which will be active when the usage time reaches 2000 hr. However the life of lamp might be much different among lamps, so that it might be happened that a lamp is cut off before the function is active.

6-9 Indicators Message

The POWER indicator, LAMP indicator, and TEMP indicator are lit and blank as follows. Take the appropriate measures.

POWER indicator	LAMP indicator	TEMP indicator	Contents
Lights orange	Turns off	Turns off	The Standby mode has been set.
Blinks green	Turns off	Turns off	Warming up. Please wait.
Lights green	Turns off	Turns off	ON. Normal operation possible.
Blinks orange	Turns off	Turns off	Cooling. Please wait.
Blinks red	-	-	Cooling. Please wait. The error is found. Take the appropriate measures when the POWER indicator ceases blinking
Blinks /Lights red	Lights red	Turns off	Lamp is not lit. The interior of the equipment may be too hot. Switch power OFF, wait 20 minutes until the equipment cools, and check whether the ventilation openings are blocked, whether the air filter is dirty, or whether the ambient temperature exceeds 35 °C. And switch power ON again. Replace the lamp if the same problem occurs.
Blinks /Lights red	Blinks red	Turns off	Lamp or lamp cover is not found, or hasn't been fitted in correctly. Switch power OFF, and wait for 45 minutes until the equipment cools. Check fitting of the lamp and lamp cover, and switch power ON again.
Blinks /Lights red	Turns off	Blinks red	The cooling fan is not operating. Switch power OFF, and wait for 20 minutes until the equipment cools. Check for foreign matters in the fan, and switch power ON again.
Blinks /Lights red	Turns off	Lights red	The interior of the equipment is too hot. Switch power OFF, and wait for 20 minutes until the equipment cools. Check whether the ventilation openings are blocked, whether the air filter is dirty, or whether the ambient temperature exceeds 35 °C. Then switch power ON again.
Lights green	Blinks red	Blinks red	The interior of the equipment is too cool. Check whether the ambient temperature is below 0°C. Contact your dealer if the same problem occurs when the ambient temperature is 0~35°C.

NOTE When the internal temperature becomes excessive power is switched OFF automatically for safety reasons, and the indicator is extinguished. Set the power switch to [O] and wait for 20 minutes until the equipment has cooled sufficiently.

6-10 Setup of a Cooling Fan Speed

When using this projector in the place where altitude is high, we recommend you to set a cooling fan's speed as "HIGH". It is because the cooling efficiency of a projector falls and the temperature inside a projector rises easily in such a place, since the density of air becomes low.

Setting Method of Cooling Fan Speed

1. To display the OSD for cooling fan speed setup:

	By the control panel	By the remote control transmitter
A proper signal is input	1. Display the menu by the "MENU" button. 2. Select the "OPTION" on the menu. 3. Continue press the button "▲" first, then press the button "RESET" together with "▲" and hold for 3 seconds.	1. Display the menu by the "MENU" button. 2. Select the "OPTION" on the menu. 3. Continue pressing the button "MAGNIFY OFF" for 3 seconds.
No signal is input	1. Display the menu by the "MENU" button. 2. Select the "VOLUME" on the menu. 3. Continue press the button "▲" first, then press the button "RESET" together with "▲" and hold for 3 seconds.	1. Display the menu by the "MENU" button. 2. Select the "VOLUME" on the menu. 3. Continue pressing the button "MAGNIFY OFF" for 3 seconds.

2. Select the "HIGH" on the OSD using the button "▶". To reset this setup, select the "NORMAL" using the button "◀".
3. The OSD will be ended by no operation for 10 seconds or change of input signal. To end immediately, use one of buttons except buttons "▲", "▼", "◀", "▶", "RESET", "MENU SELECT", "MAGNIFY +/-/OFF", "FREEZE" (when no signal is input) or "POSITION" (when no signal is input).

NOTE:

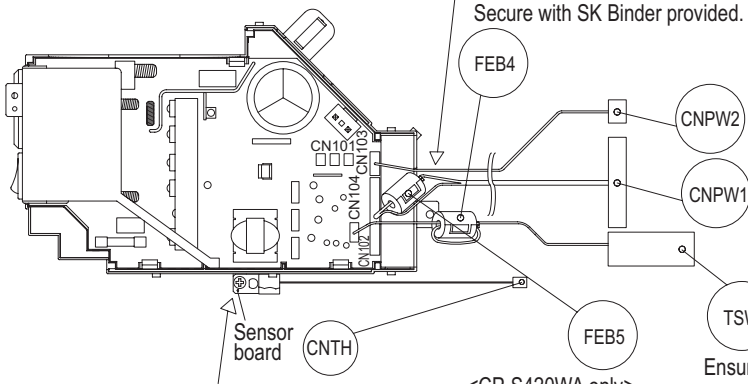
- The "HIGH" mode makes the fan noisy than "NORMAL" mode.
- The recall of factory setting sets the fan speed to "NORMAL" mode. You must set the fan speed after recall of factory setting if you need "HIGH" mode.

1.Power board block wiring
(1) Power board wiring

Before fitting circuit power board into its holder, make sure CNPW1, CNPW2 and TSW cables are properly connected to CN102, CN103 and CN104 connectors, respectively.
(You cannot connect cables after fitting power board.)

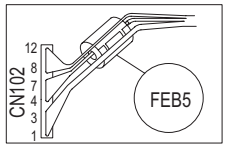
Place the 3 cables through a notch in power board holder leaving no slack in cables.
(Cable slack may touch primary power circuit.)

Loop TSW once close to exit point of power holder cable as in diagram and attach FEB4. Secure with SK Binder provided.

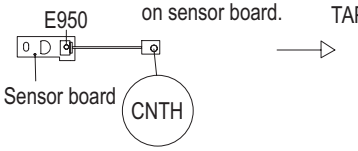


Mount sensor board after taking following steps:

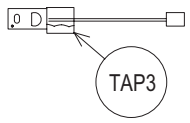
<CP-S420WA only>
Attach FEB5 to CNPW1 close to CN102 as in diagram. Note that wires the core should be attached to are from 4th to 7th shown in the right.



Connect CNTH to E950 connector on sensor board.



Check E950 connector and fix it using TAP3 (so that connector may not come off).



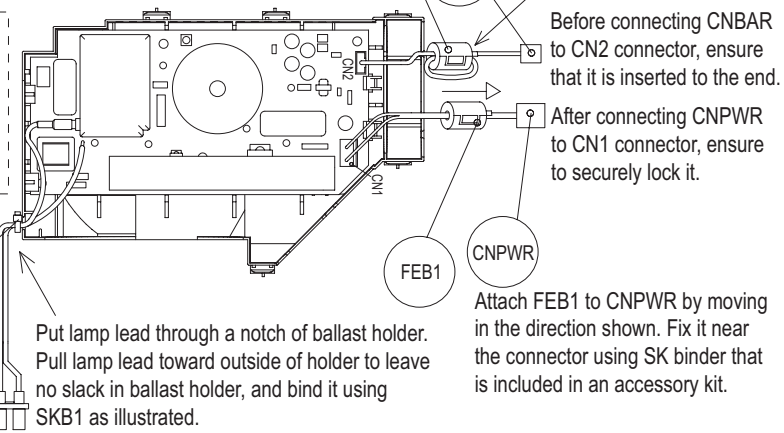
(2) Ballast board block wiring

Attach FEB3 to CNBAR. Make a loop at cable outlet on ballast holder as illustrated. Delete provided SK Binder.

Attach so that hole for securing SK Binder on FEB3 comes to connector side as in diagram.

Before connecting CNBAR to CN2 connector, ensure that it is inserted to the end.

After connecting CNPWR to CN1 connector, ensure to securely lock it.



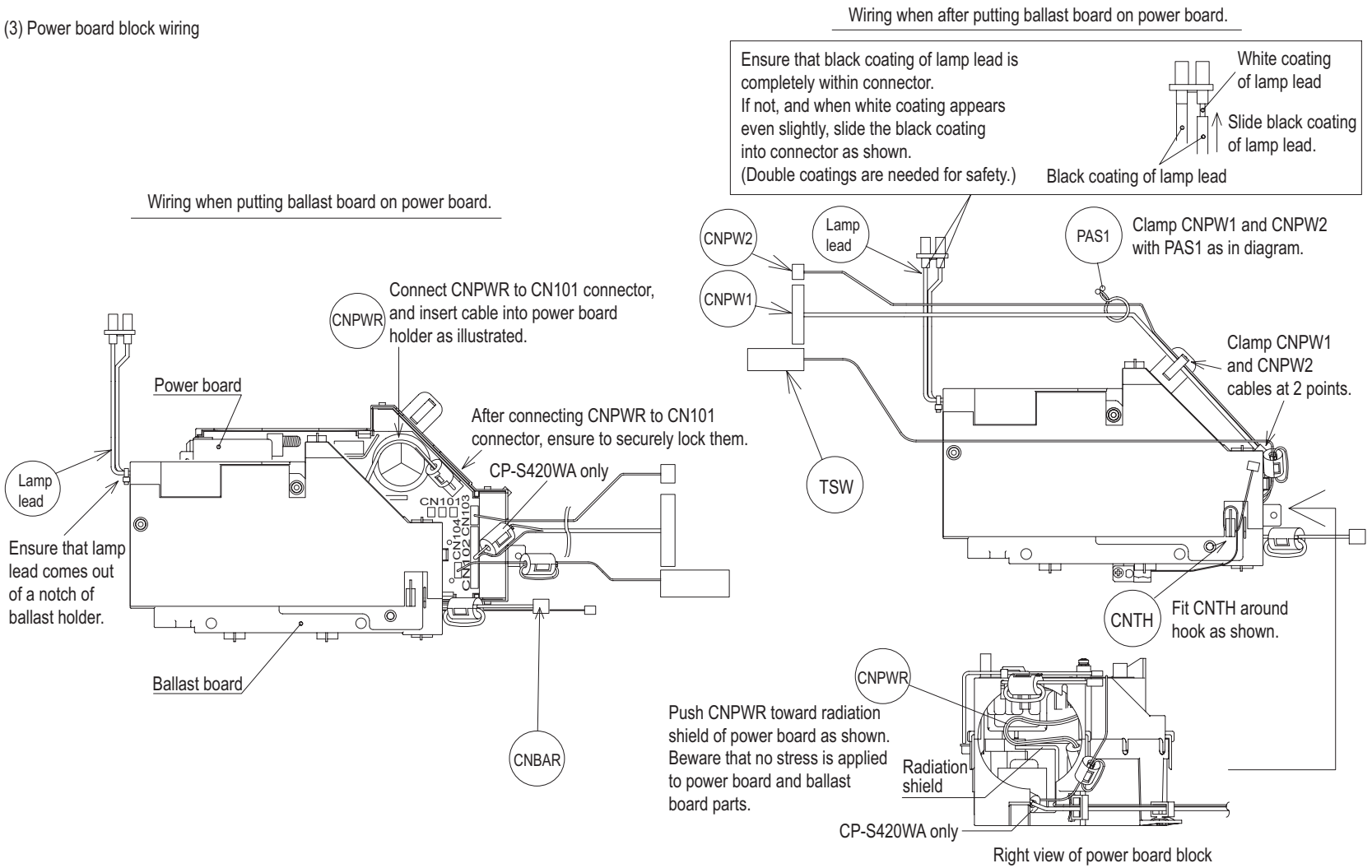
Attach FEB1 to CNPWR by moving in the direction shown. Fix it near the connector using SK binder that is included in an accessory kit.

Put lamp lead through a notch of ballast holder. Pull lamp lead toward outside of holder to leave no slack in ballast holder, and bind it using SKB1 as illustrated.

Ensure that model indication of TSW is 90AR1U1N.

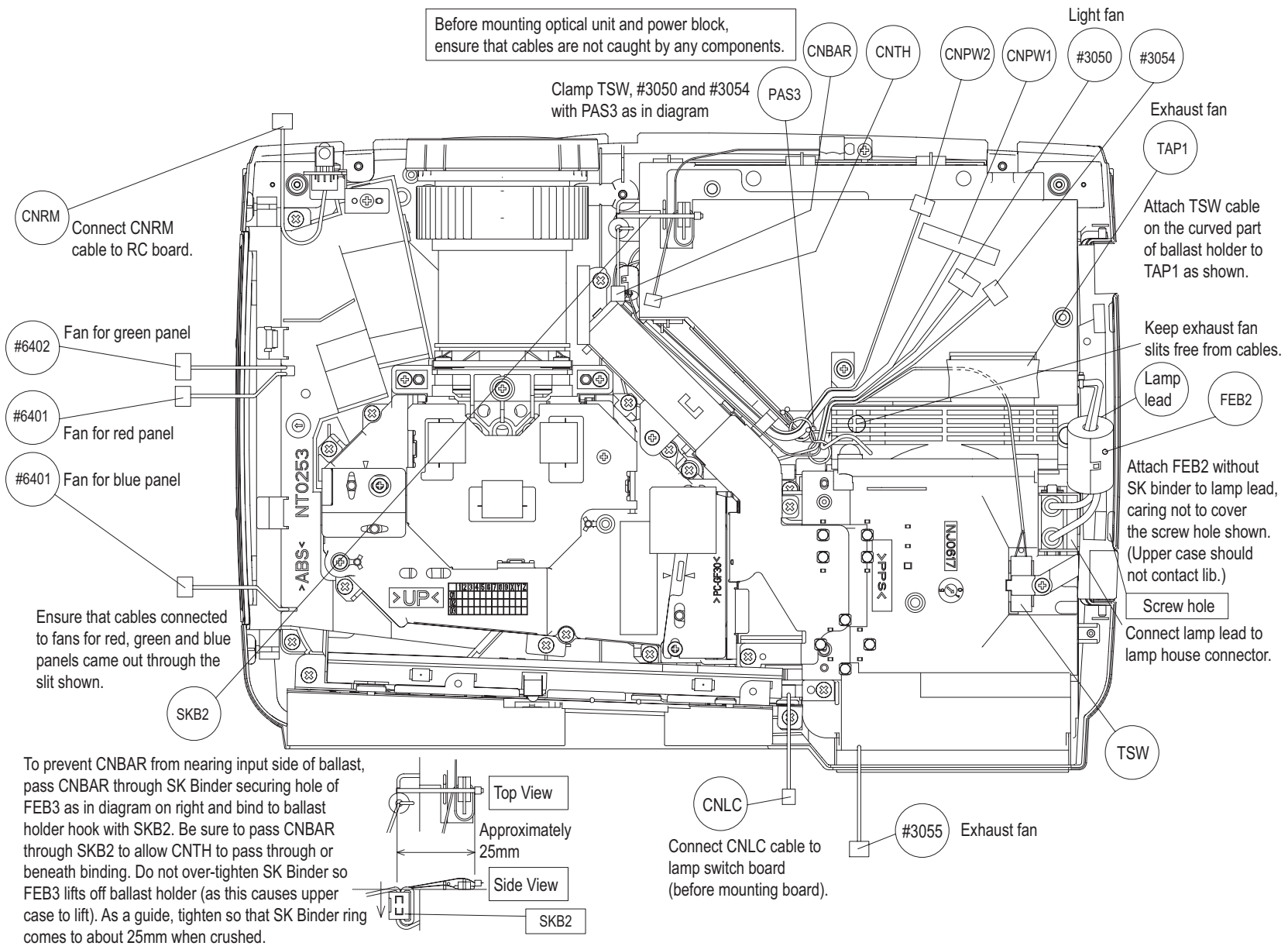
C7S2 / C7X2 Chassis Wiring diagram 1

(3) Power board block wiring


Wiring when after putting ballast board on power board.
Ensure that black coating of lamp lead is completely within connector.
If not, and when white coating appears even slightly, slide the black coating into connector as shown.
(Double coatings are needed for safety.)
White coating of lamp lead
Slide black coating of lamp lead.
Black coating of lamp lead
Wiring when putting ballast board on power board.
CNPW2
Lamp lead
PAS1
Clamp CNPW1 and CNPW2 with PAS1 as in diagram.
CNPW1
Clamp CNPW1 and CNPW2 cables at 2 points.
TSW
CNPWR
Connect CNPWR to CN101 connector, and insert cable into power board holder as illustrated.
Power board
After connecting CNPWR to CN101 connector, ensure to securely lock them.
CP-S420WA only
Lamp lead
CN101
CN103
CN104
CN102
Ensure that lamp lead comes out of a notch of ballast holder.
CNTH
Fit CNTH around hook as shown.
CNPWR
Push CNPWR toward radiation shield of power board as shown.
Beware that no stress is applied to power board and ballast board parts.
Radiation shield
Ballast board
CNBAR
CP-S420WA only
Right view of power board block

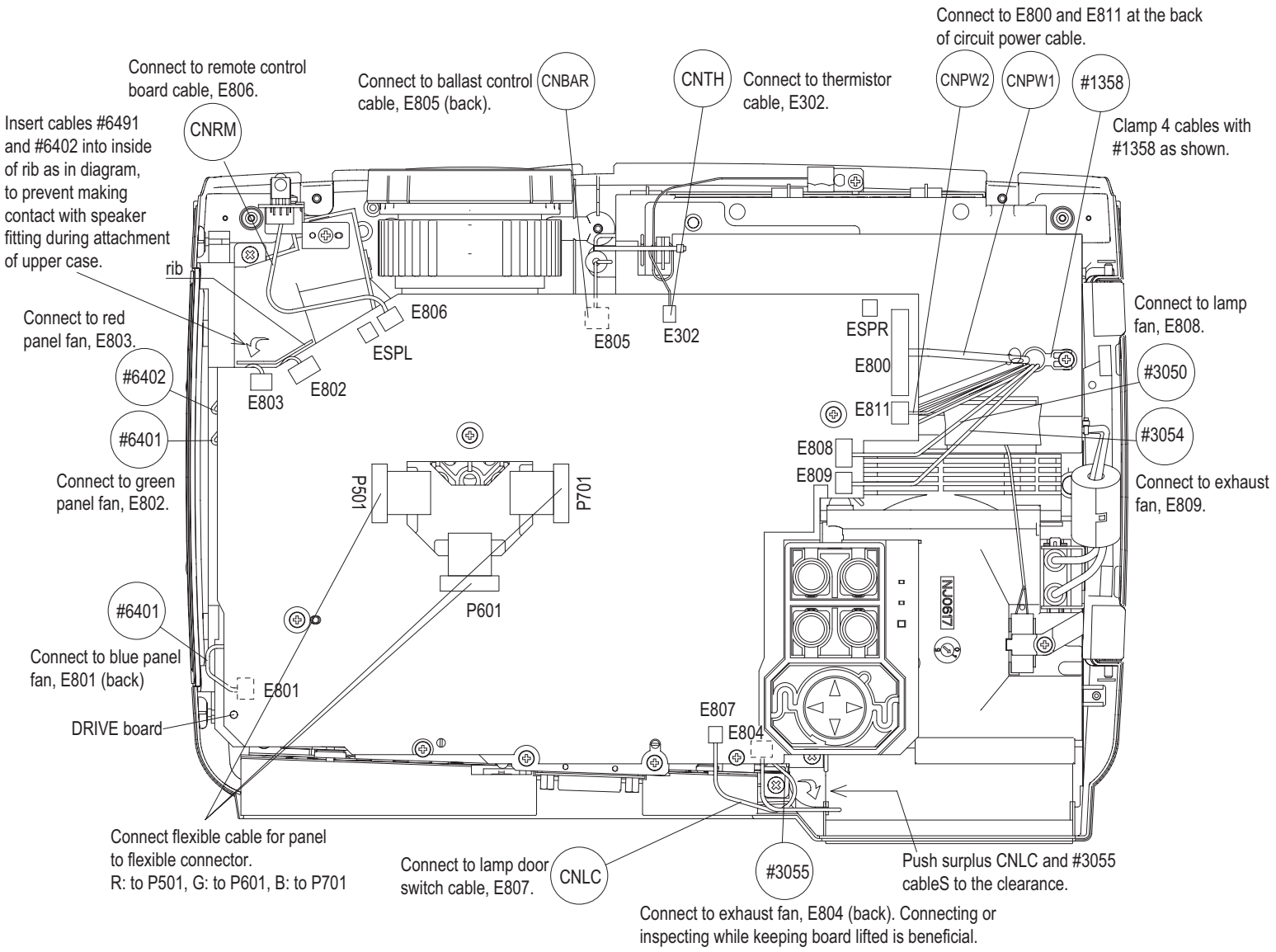
C7S2 / C7X2 Chassis Wiring diagram 2

2.Wiring when mounting power block and optical unit on bottom case


Before mounting optical unit and power block, ensure that cables are not caught by any components.
CNBAR
CNTH
CNPW2
CNPW1
Light fan
#3050
#3054
Clamp TSW, #3050 and #3054 with PAS3 as in diagram
PAS3
Exhaust fan
TAP1
CNRM
Connect CNRM cable to RC board.
Attach TSW cable on the curved part of ballast holder to TAP1 as shown.
#6402
Fan for green panel
Keep exhaust fan slits free from cables.
#6401
Fan for red panel
Lamp lead
FEB2
#6401
Fan for blue panel
Attach FEB2 without SK binder to lamp lead, caring not to cover the screw hole shown. (Upper case should not contact lib.)
Screw hole
Connect lamp lead to lamp house connector.
Ensure that cables connected to fans for red, green and blue panels came out through the slit shown.
SKB2
TSW
To prevent CNBAR from nearing input side of ballast, pass CNBAR through SK Binder securing hole of FEB3 as in diagram on right and bind to ballast holder hook with SKB2. Be sure to pass CNBAR through SKB2 to allow CNTH to pass through or beneath binding. Do not over-tighten SK Binder so FEB3 lifts off ballast holder (as this causes upper case to lift). As a guide, tighten so that SK Binder ring comes to about 25mm when crushed.
Top View
Approximately 25mm
Side View
SKB2
CNLC
Connect CNLC cable to lamp switch board (before mounting board).
#3055
Exhaust fan

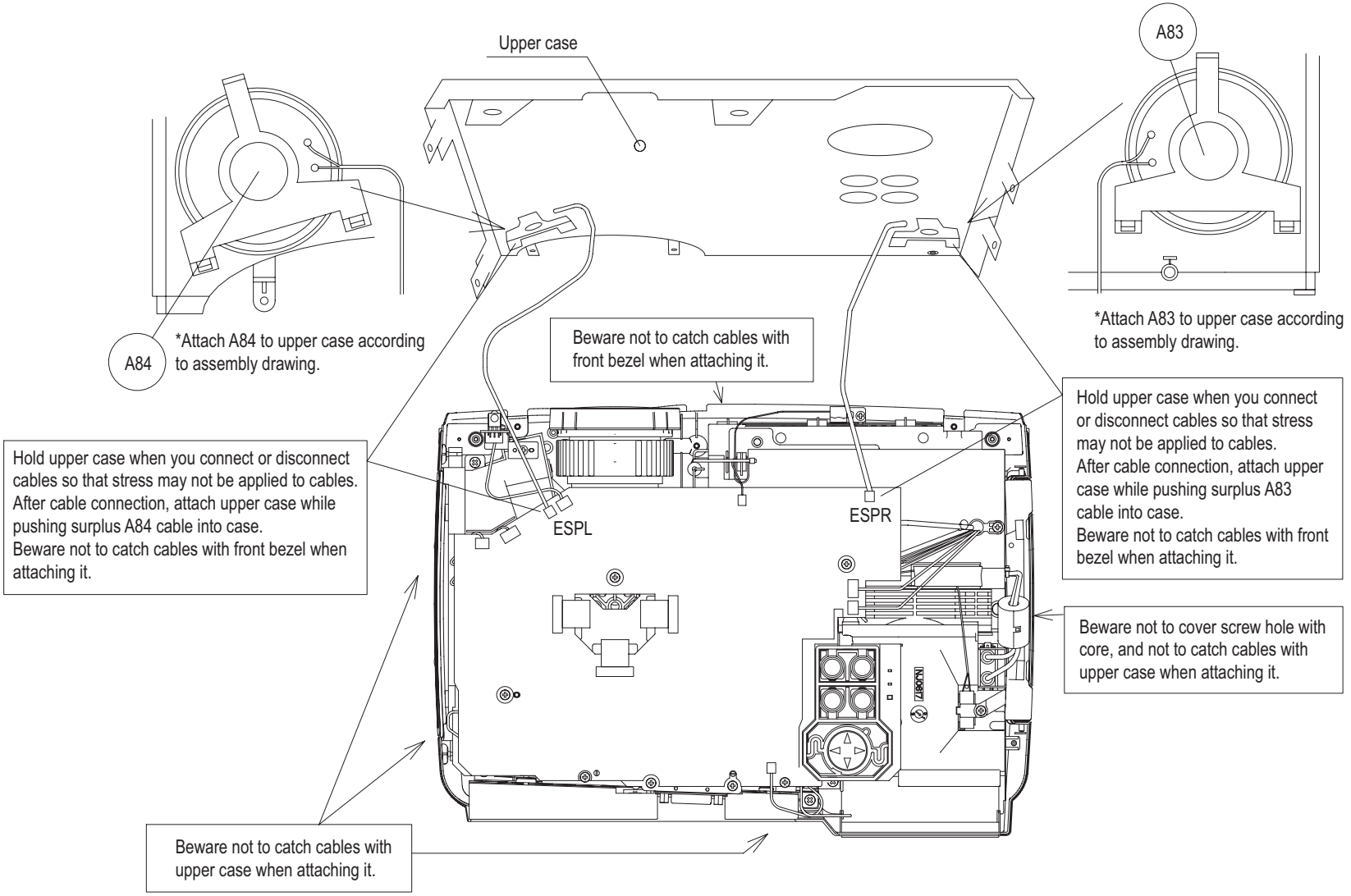
C7S2 / C7X2 Chassis Wiring diagram 3

3.Wiring when mounting drive board



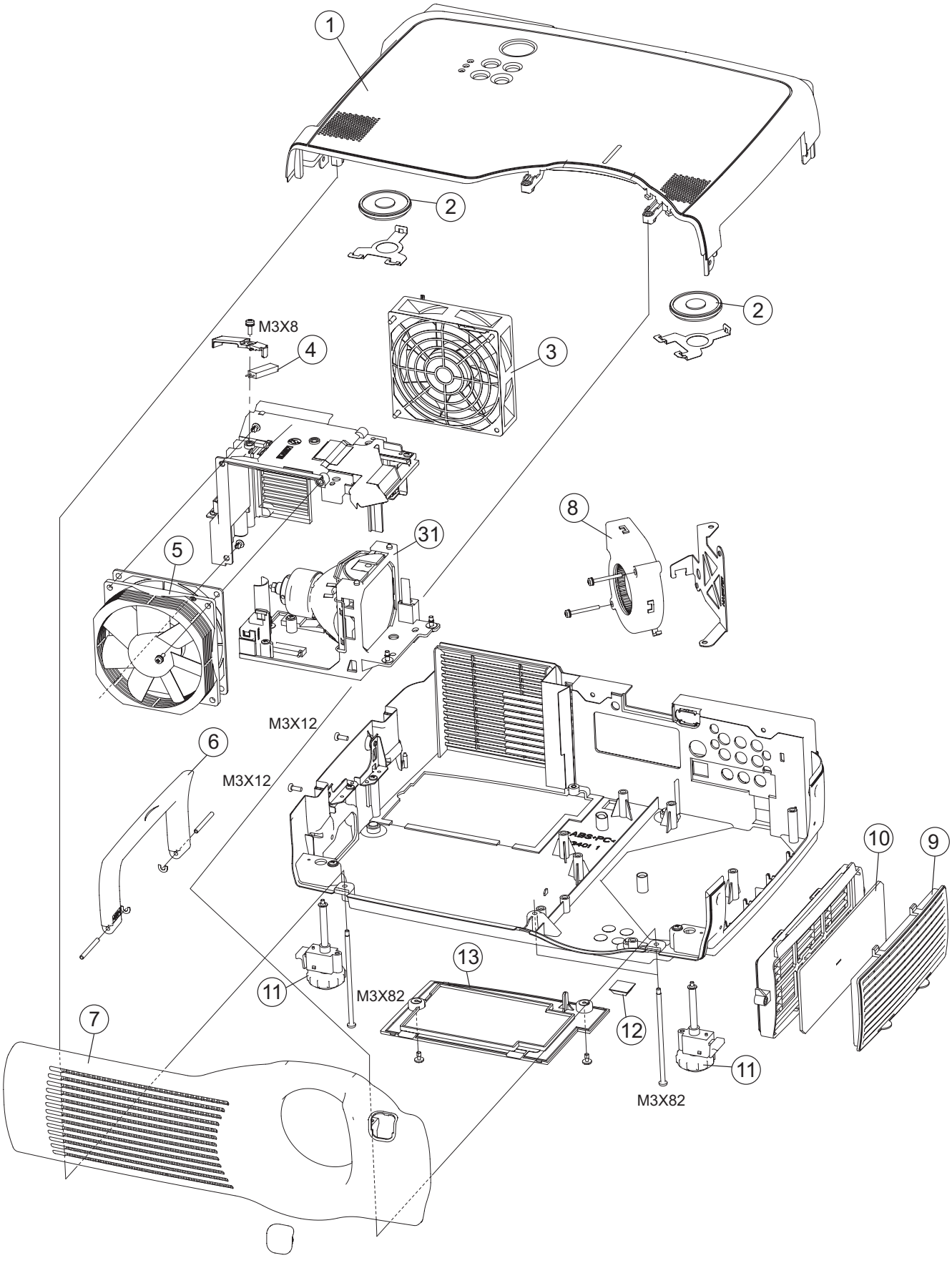
C7S2 / C7X2 Chassis Wiring diagram 4

4.Wiring when attaching upper case

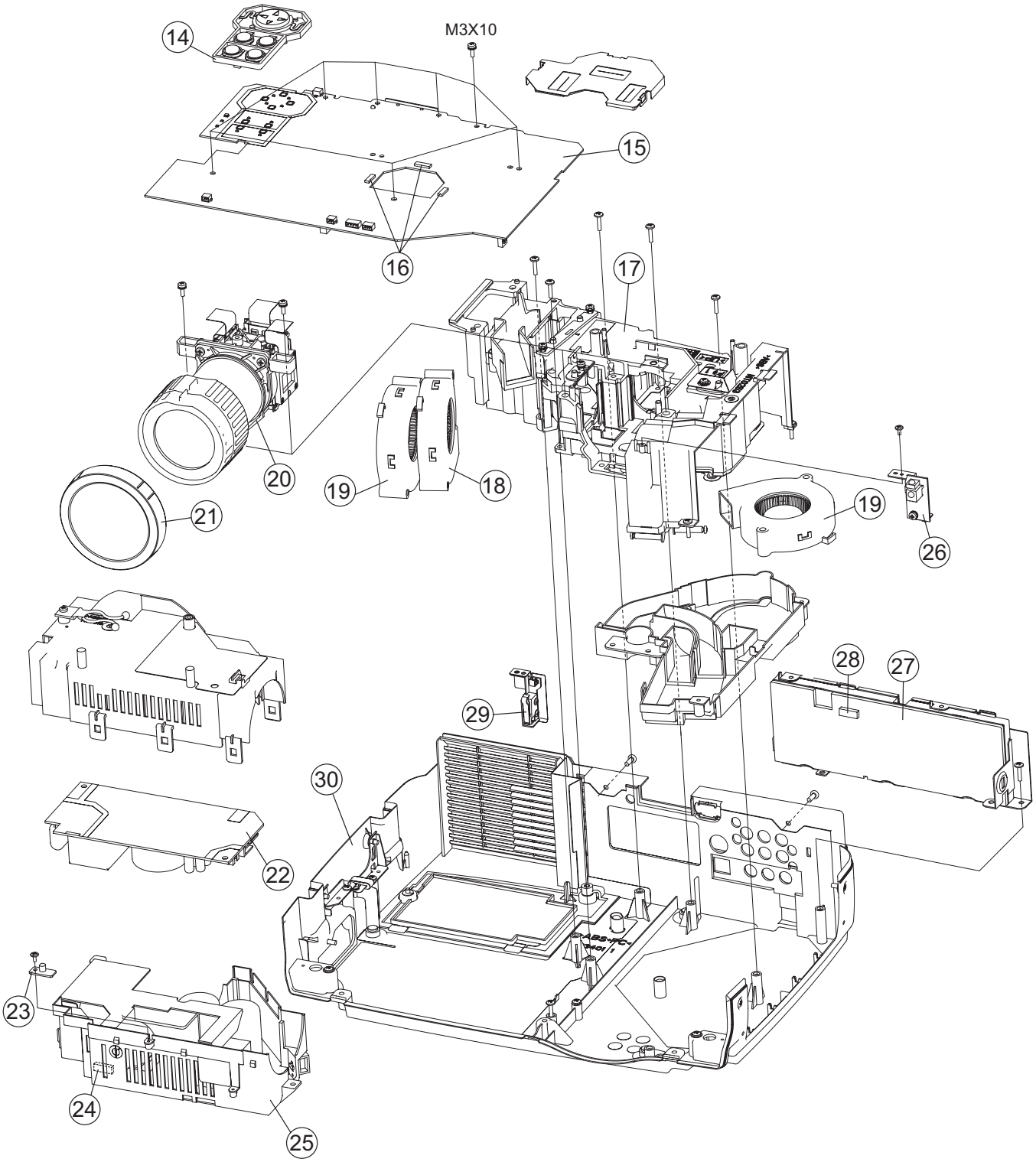

Upper case
A83
*Attach A83 to upper case according to assembly drawing.
A84
*Attach A84 to upper case according to assembly drawing.
Beware not to catch cables with front bezel when attaching it.
Hold upper case when you connect or disconnect cables so that stress may not be applied to cables.
After cable connection, attach upper case while pushing surplus A84 cable into case.
Beware not to catch cables with front bezel when attaching it.
ESPL
ESPR
Hold upper case when you connect or disconnect cables so that stress may not be applied to cables.
After cable connection, attach upper case while pushing surplus A83 cable into case.
Beware not to catch cables with front bezel when attaching it.
Beware not to cover screw hole with core, and not to catch cables with upper case when attaching it.
Beware not to catch cables with upper case when attaching it.

C7S2 / C7X2 Chassis Wiring diagram 5

8. Disassembly diagram



CPX430WA(C7X2)



THE UPDATED PARTS LIST

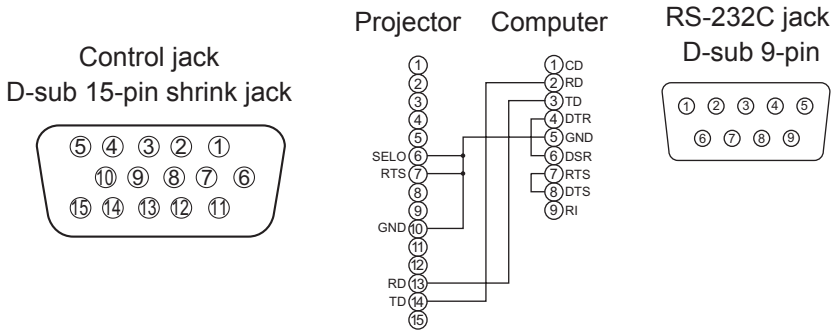
FOR THIS MODEL IS

AVAILABLE ON ESTA

10. RS-232C communication

(1) Turn off the projector and computer power supplies and connect with the RS-232C cable.

(2) Turn on the computer power supply and, after the computer has started up, turn on the projector power supply.



Communications setting

19200bps, 8N1

1 Protocol

Consist of header (7 bytes) + command data (6 bytes).

2 Header

BE + EF + 03 + 06 + 00 + CRC_low + CRC_high.

CRC_low : Lower byte of CRC flag for command data.

CRC_high : Upper byte of CRC flag for command data.

3 Command data

Command data chart

byte_0	byte_1	byte_2	byte_3	byte_4	byte_5
Action		Type		Setting code	
low	high	low	high	low	high

Action (byte_0 - 1)

Action	Classification	Content
1	SET	Change setting to desired value.
2	GET	Read projector internal setup value.
4	INCREMENT	Increment setup value by 1.
5	DECREMENT	Decrement setup value by 1.
6	EXECUTE	Run a command.

Requesting projector status (Get command)

(1) Send the request code Header + Command data (‘02H’+‘00H’+ type (2 bytes) +‘00H’+‘00H’) from the computer to the projector.
(2) The projector returns the response code ‘1DH’+ data (2 bytes) to the computer.

Changing the projector settings (Set command)

(1) Send the setting code Header + Command data (‘01H’+‘00H’+ type (2 bytes) + setting code (2 bytes)) from the computer to the projector.
(2) The projector changes the setting based on the above setting code.
(3) The projector returns the response code ‘06H’ to the computer.

Using the projector default settings (Reset Command)

(1) The computer sends the default setting code Header + Command data (‘06H’+‘00H’+ type (2 bytes) +‘00H’+ ‘00H’) to the projector.
(2) The projector changes the specified setting to the default value.
(3) The projector returns the response code ‘06H’ to the computer.

Increasing the projector setting value (Increment command)

(1) The computer sends the increment code Header + Command data (‘04H’+‘00H’+ type (2 bytes) +‘00H’+‘00H’) to the projector.
(2) The projector increases the setting value on the above setting code.
(3) The projector returns the response code ‘06H’ to the computer.

Decreasing the projector setting value (Decrement command)

(1) The computer sends the decrement code Header + Command data (‘05H’+‘00H’+ type (2 bytes) +‘00H’+ ‘00H’) to the projector.
(2) The projector decreases the setting value on the above setting code.
(3) The projector returns the response code ‘06H’ to the computer.

When the projector cannot understand the received command

When the projector cannot understand the received command, the error code ‘15H’ is sent back to the computer.
Sometimes the projector cannot properly receive the command. In such a case, the command is not executed and the error code ‘15H’ is sent back to the computer. If this error code is returned, send the same command again.

When the projector cannot execute the received command

When the projector cannot execute the received command, the error code ‘1cH’ + ‘xxxxH’ is sent back to the computer. When the data length is greater than indicated by the data length code, the projector ignore the excess data code.
Conversely when the data length is shorter than indicated by the data length code, an error code will be returned to the computer.

NOTE:

- Operation cannot be guaranteed when the projector receives an undefined command or data.
- Provide an interval of at least 40ms between the response code and any other code.
- The projector outputs test data when the power supply is switched ON, and when the lamp is lit. Ignore this data.
- Commands are not accepted during warm-up.

Command data chart

Names	Operation type		Header	CRC	Command data		
					Action	Type	Setting code
Blank Color	Set	Red	BE EF 03 06 00	3B D3	01 00	00 30	00 00
		Orange	BE EF 03 06 00	AB D2	01 00	00 30	01 00
		Green	BE EF 03 06 00	5B D2	01 00	00 30	02 00
		Blue	BE EF 03 06 00	CB D3	01 00	00 30	03 00
		Purple	BE EF 03 06 00	FB D1	01 00	00 30	04 00
		White	BE EF 03 06 00	6B D0	01 00	00 30	05 00
		Black	BE EF 03 06 00	9B D0	01 00	00 30	06 00
		MyScreen	BE EF 03 06 00	FB CA	01 00	00 30	20 00
		ORIGINAL	BE EF 03 06 00	FB E2	01 00	00 30	40 00
	Get		BE EF 03 06 00	08 D3	02 00	00 30	00 00
Mirror	Set	Normal	BE EF 03 06 00	C7 D2	01 00	01 30	00 00
		H Inverse	BE EF 03 06 00	57 D3	01 00	01 30	01 00
		V Inverse	BE EF 03 06 00	A7 D3	01 00	01 30	02 00
		H&V Inverse	BE EF 03 06 00	37 D2	01 00	01 30	03 00
	Get		BE EF 03 06 00	F4 D2	02 00	01 30	00 00
Freeze	Set	Normal	BE EF 03 06 00	83 D2	01 00	02 30	00 00
		Freeze	BE EF 03 06 00	13 D3	01 00	02 30	01 00
	Get		BE EF 03 06 00	B0 D2	02 00	02 30	00 00
Menu Color	Set	Red	BE EF 03 06 00	7F D3	01 00	03 30	00 00
		Orange	BE EF 03 06 00	EF D2	01 00	03 30	01 00
		Green	BE EF 03 06 00	1F D2	01 00	03 30	02 00
		Blue	BE EF 03 06 00	8F D3	01 00	03 30	03 00
		Purple	BE EF 03 06 00	BF D1	01 00	03 30	04 00
		Transparent	BE EF 03 06 00	2F D0	01 00	03 30	05 00
		Gray	BE EF 03 06 00	DF D0	01 00	03 30	06 00
	Get		BE EF 03 06 00	4C D3	02 00	03 30	00 00
Startup	Set	ORIGINAL	BE EF 03 06 00	0B D2	01 00	04 30	00 00
		OFF	BE EF 03 06 00	9B D3	01 00	04 30	01 00
		MyScreen	BE EF 03 06 00	CB CB	01 00	04 30	20 00
	Get		BE EF 03 06 00	38 D2	02 00	04 30	00 00
Language	Set	English	BE EF 03 06 00	F7 D3	01 00	05 30	00 00
		Français	BE EF 03 06 00	67 D2	01 00	05 30	01 00
		Deutsch	BE EF 03 06 00	97 D2	01 00	05 30	02 00
		Español	BE EF 03 06 00	07 D3	01 00	05 30	03 00
		Italiano	BE EF 03 06 00	37 D1	01 00	05 30	04 00
		Norsk	BE EF 03 06 00	A7 D0	01 00	05 30	05 00
		Nederlands	BE EF 03 06 00	57 D0	01 00	05 30	06 00
		Português	BE EF 03 06 00	C7 D1	01 00	05 30	07 00
		Japanese	BE EF 03 06 00	37 D4	01 00	05 30	08 00
	Get		BE EF 03 06 00	C4 D3	02 00	05 30	00 00

Command data chart

Names	Operation type		Header	CRC	Command data: Action	Type	Setting code
Magnify	Get		BE EF 03 06 00	7C D2	02 00	07 30	00 00
	Increment		BE EF 03 06 00	1A D2	04 00	07 30	00 00
	Decrement		BE EF 03 06 00	CB D3	05 00	07 30	00 00
Auto off	Get		BE EF 03 06 00	08 86	02 00	10 31	00 00
	Increment		BE EF 03 06 00	6E 86	04 00	10 31	00 00
	Decrement		BE EF 03 06 00	BF 87	05 00	10 31	00 00
Brightness Reset	Execute		BE EF 03 06 00	58 D3	06 00	00 70	00 00
Contrast Reset	Execute		BE EF 03 06 00	A4 D2	06 00	01 70	00 00
V.Position Reset	Execute		BE EF 03 06 00	E0 D2	06 00	02 70	00 00
H.Position Reset	Execute		BE EF 03 06 00	IC D3	06 00	03 70	00 00
H.Size Reset	Execute		BE EF 03 06 00	68 D2	06 00	04 70	00 00
Color Balance R Reset	Execute		BE EF 03 06 00	94 D3	06 00	05 70	00 00
Color Balance B Reset	Execute		BE EF 03 06 00	D0 D3	06 00	06 70	00 00
Sharpness Reset	Execute		BE EF 03 06 00	C4 D0	06 00	09 70	00 00
Color Reset	Execute		BE EF 03 06 00	80 D0	06 00	0A 70	00 00
Tint Reset	Execute		BE EF 03 06 00	7C D1	06 00	0B 70	00 00
Keystone_V Reset	Execute		BE EF 03 06 00	08 D0	06 00	0C 70	00 00
Keystone_H Reset	Execute		BE EF 03 06 00	98 D8	06 00	20 70	00 00
Auto	Execute		BE EF 03 06 00	91 D0	06 00	0A 20	00 00
Blank on/off	Set	off	BE EF 03 06 00	FB D8	01 00	20 30	00 00
		on	BE EF 03 06 00	6B D9	01 00	20 30	01 00
	Get		BE EF 03 06 00	C8 D8	02 00	20 30	00 00
Error Status	Get		BE EF 03 06 00	D9 D8	02 00	20 60	00 00
			(Example of Return) 00 00 (Normal) 01 00 (Cover-error) 02 00 (Fan-error) 03 00 (Lamp-error) 04 00 (Temp-error) 05 00 (Air flow-error) 06 00 (Lamp-Time-over)				
Power	Set	OFF	BE EF 03 06 00	2A D3	01 00	00 60	00 00
		ON	BE EF 03 06 00	BA D2	01 00	00 60	01 00
	Get		BE EF 03 06 00	19 D3	02 00	00 60	00 00
Input Source	Set	RGB1	BE EF 03 06 00	FE D2	01 00	00 20	00 00
		RGB2	BE EF 03 06 00	3E D0	01 00	00 20	04 00
		DVI	BE EF 03 06 00	0E D2	01 00	00 20	03 00
		Video	BE EF 03 06 00	6E D3	01 00	00 20	01 00
		SVideo	BE EF 03 06 00	9E D3	01 00	00 20	02 00
		Component	BE EF 03 06 00	AE D1	01 00	00 20	05 00
	Get		BE EF 03 06 00	CD D2	02 00	00 20	00 00
Volume	Get		BE EF 03 06 00	31 D3	02 00	01 20	00 00
	Increment		BE EF 03 06 00	57 D3	04 00	01 20	00 00
	Decrement		BE EF 03 06 00	86 D2	05 00	01 20	00 00

Command data chart

Names	Operation type		Header	CRC	Command data		
					Action	Type	Setting code
Mute	Set	Normal	BE EF 03 06 00	46 D3	01 00	02 20	00 00
		Mute	BE EF 03 06 00	D6 D2	01 00	02 20	01 00
	Get		BE EF 03 06 00	75 D3	02 00	02 20	00 00
Brightness	Get		BE EF 03 06 00	89 D2	02 00	03 20	00 00
	Increment		BE EF 03 06 00	EF D2	04 00	03 20	00 00
	Decrement		BE EF 03 06 00	3E D3	05 00	03 20	00 00
Contrast	Get		BE EF 03 06 00	FD D3	02 00	04 20	00 00
	Increment		BE EF 03 06 00	9B D3	04 00	04 20	00 00
	Decrement		BE EF 03 06 00	4A D2	05 00	04 20	00 00
Color Balance R	Get		BE EF 03 06 00	01 D2	02 00	05 20	00 00
	Increment		BE EF 03 06 00	67 D2	04 00	05 20	00 00
	Decrement		BE EF 03 06 00	B6 D3	05 00	05 20	00 00
Color Balance B	Get		BE EF 03 06 00	45 D2	02 00	06 20	00 00
	Increment		BE EF 03 06 00	23 D2	04 00	06 20	00 00
	Decrement		BE EF 03 06 00	F2 D3	05 00	06 20	00 00
Keystone_V	Get		BE EF 03 06 00	B9 D3	02 00	07 20	00 00
	Increment		BE EF 03 06 00	DF D3	04 00	07 20	00 00
	Decrement		BE EF 03 06 00	0E D2	05 00	07 20	00 00
Keystone_H	Get		BE EF 03 06 00	E9 D0	02 00	0B 20	00 00
	Increment		BE EF 03 06 00	8F D0	04 00	0B 20	00 00
	Decrement		BE EF 03 06 00	5E D1	05 00	0B 20	00 00
Aspect	Set	4:3, Full	BE EF 03 06 00	9E D0	01 00	08 20	00 00
		16:9	BE EF 03 06 00	0E D1	01 00	08 20	01 00
		Small	BE EF 03 06 00	FE D1	01 00	08 20	02 00
	Get		BE EF 03 06 00	AD D0	02 00	08 20	00 00
Display Position at 16 : 9 or Small	Set	Default	BE EF 03 06 00	62 D1	01 00	09 20	00 00
		Bottom	BE EF 03 06 00	F2 D0	01 00	09 20	01 00
		Top	BE EF 03 06 00	02 D0	01 00	09 20	02 00
	Get		BE EF 03 06 00	51 D1	02 00	09 20	00 00
V.Position	Get		BE EF 03 06 00	0D 83	02 00	00 21	00 00
	Increment		BE EF 03 06 00	6B 83	04 00	00 21	00 00
	Decrement		BE EF 03 06 00	BA 82	05 00	00 21	00 00
H.Position	Get		BE EF 03 06 00	F1 82	02 00	01 21	00 00
	Increment		BE EF 03 06 00	97 82	04 00	01 21	00 00
	Decrement		BE EF 03 06 00	46 83	05 00	01 21	00 00
H.Size	Get		BE EF 03 06 00	B5 82	02 00	02 21	00 00
	Increment		BE EF 03 06 00	D3 82	04 00	02 21	00 00
	Decrement		BE EF 03 06 00	02 83	05 00	02 21	00 00
H.Phase	Get		BE EF 03 06 00	49 83	02 00	03 21	00 00
	Increment		BE EF 03 06 00	2F 83	04 00	03 21	00 00
	Decrement		BE EF 03 06 00	FE 82	05 00	03 21	00 00

Command data chart

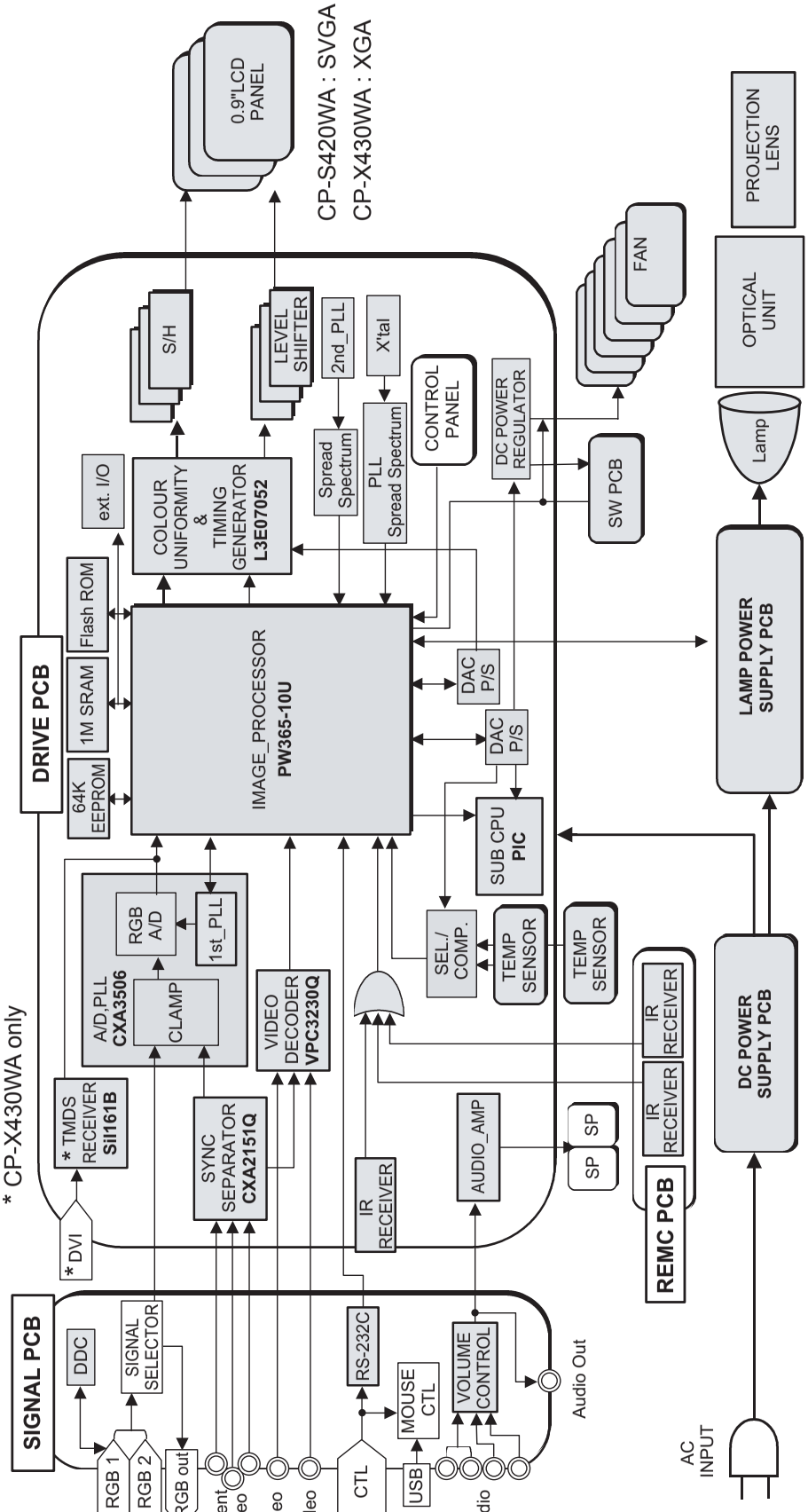
Names	Operation type		Header				Command data		
						CRC	Action	Type	Setting code
Sharpness	Get		BE EF	03	06 00	F1 72	02 00	01 22	00 00
	Increment		BE EF	03	06 00	97 72	04 00	01 22	00 00
	Decrement		BE EF	03	06 00	46 73	05 00	01 22	00 00
Color	Get		BE EF	03	06 00	B5 72	02 00	02 22	00 00
	Increment		BE EF	03	06 00	D3 72	04 00	02 22	00 00
	Decrement		BE EF	03	06 00	02 73	05 00	02 22	00 00
Tint	Get		BE EF	03	06 00	49 73	02 00	03 22	00 00
	Increment		BE EF	03	06 00	2F 73	04 00	03 22	00 00
	Decrement		BE EF	03	06 00	FE 72	05 00	03 22	00 00
Video Format	Set	Auto	BE EF	03	06 00	9E 75	01 00	00 22	0A 00
		NTSC	BE EF	03	06 00	FE 71	01 00	00 22	04 00
		PAL	BE EF	03	06 00	6E 70	01 00	00 22	05 00
		SECAM	BE EF	03	06 00	6E 75	01 00	00 22	09 00
		NTSC 4.43	BE EF	03	06 00	5E 72	01 00	00 22	02 00
		M-PAL	BE EF	03	06 00	FE 74	01 00	00 22	08 00
		N-PAL	BE EF	03	06 00	0E 71	01 00	00 22	07 00
	Get		BE EF	03	06 00	0D 73	02 00	00 22	00 00
HDTV	Set	1080i	BE EF	03	06 00	F2 73	01 00	05 22	00 00
		1035i	BE EF	03	06 00	62 72	01 00	05 22	01 00
	Get		BE EF	03	06 00	C1 73	02 00	05 22	00 00
PinP Size	Set	off	BE EF	03	06 00	FE 22	01 00	00 23	00 00
		Large	BE EF	03	06 00	6E 23	01 00	00 23	01 00
		Small	BE EF	03	06 00	9E 23	01 00	00 23	02 00
	Get		BE EF	03	06 00	CD 22	02 00	00 23	00 00
PinP Position	Set	Upper left	BE EF	03	06 00	02 23	01 00	01 23	00 00
		Upper right	BE EF	03	06 00	92 22	01 00	01 23	01 00
		bottom left	BE EF	03	06 00	62 22	01 00	01 23	03 00
		bottom right	BE EF	03	06 00	F2 23	01 00	01 23	02 00
	Get		BE EF	03	06 00	31 23	02 00	01 23	00 00
PinP Audio ch	Set	RGB	BE EF	03	06 00	BA 22	01 00	03 23	00 00
		Video	BE EF	03	06 00	2A 23	01 00	03 23	01 00
	Get		BE EF	03	06 00	89 22	02 00	03 23	00 00
PinP Input	Set	Video	BE EF	03	06 00	D6 22	01 00	02 23	01 00
		S-Video	BE EF	03	06 00	26 22	01 00	02 23	02 00
	Get		BE EF	03	06 00	75 23	02 00	02 23	00 00

Command data chart

Names	Operation type		Header	CRC	Command data		
					Action	Type	Setting code
Sync on G	Set	off	BE EF 03 06 00	CB D0	01 00	08 30	01 00
		on	BE EF 03 06 00	5B D1	01 00	08 30	00 00
	Get		BE EF 03 06 00	68 D1	02 00	08 30	00 00
WHISPER	Set	NORMAL	BE EF 03 06 00	3B 23	01 00	00 33	00 00
		WHISPER	BE EF 03 06 00	AB 22	01 00	00 33	01 00
	Get		BE EF 03 06 00	08 23	02 00	00 33	00 00
GAMMA	Set	NORMAL	BE EF 03 06 00	C7 F0	01 00	A1 30	00 00
		CINEMA	BE EF 03 06 00	57 F1	01 00	A1 30	01 00
		DYNAMIC	BE EF 03 06 00	A7 F1	01 00	A1 30	02 00
	Get		BE EF 03 06 00	F4 F0	02 00	A1 30	00 00
IR Remote Front	Set	off	BE EF 03 06 00	FF 32	01 00	00 26	00 00
		on	BE EF 03 06 00	6F 33	01 00	00 26	01 00
	Get		BE EF 03 06 00	CC 32	02 00	00 26	00 00
IR Remote Rear	Set	off	BE EF 03 06 00	03 33	01 00	01 26	00 00
		on	BE EF 03 06 00	93 32	01 00	01 26	01 00
	Get		BE EF 03 06 00	30 33	02 00	01 26	00 00
IR Remote Top	Set	off	BE EF 03 06 00	47 33	01 00	02 26	00 00
		on	BE EF 03 06 00	D7 32	01 00	02 26	01 00
	Get		BE EF 03 06 00	74 33	02 00	02 26	00 00

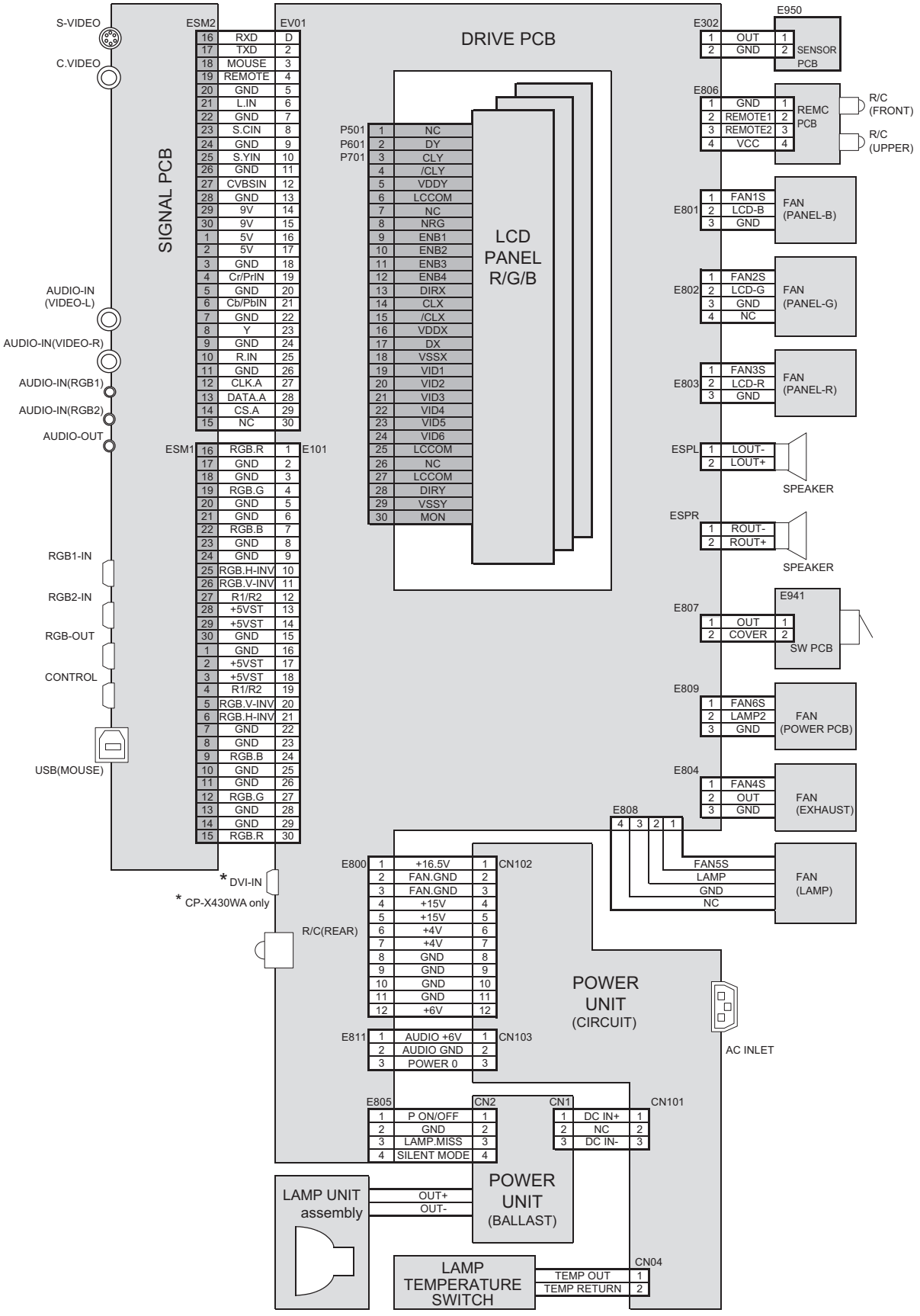
NOTE • The max. 2 IR remote out of 3 (front, rear and top) can be activated.

11. Block diagram



Block diagram (C7S2/C7X2)

12. Connector connection diagram



Connector connection diagram (C7S2/C7X2)

13. Circuit diagrams

Parts with hatching are not mounted.

Basic circuit diagram list

SENSOR PCB

REMOTE CONTROL PCB

LIMIT SWITCH PCB

POWER UNIT BALLAST

POWER UNIT CIRCUIT

DRIVE PCB - 1

DRIVE PCB - 2

DRIVE PCB - 3

DRIVE PCB - 4

DRIVE PCB - 5

DRIVE PCB - 6

DRIVE PCB - 7

DRIVE PCB - 8

DRIVE PCB - 9

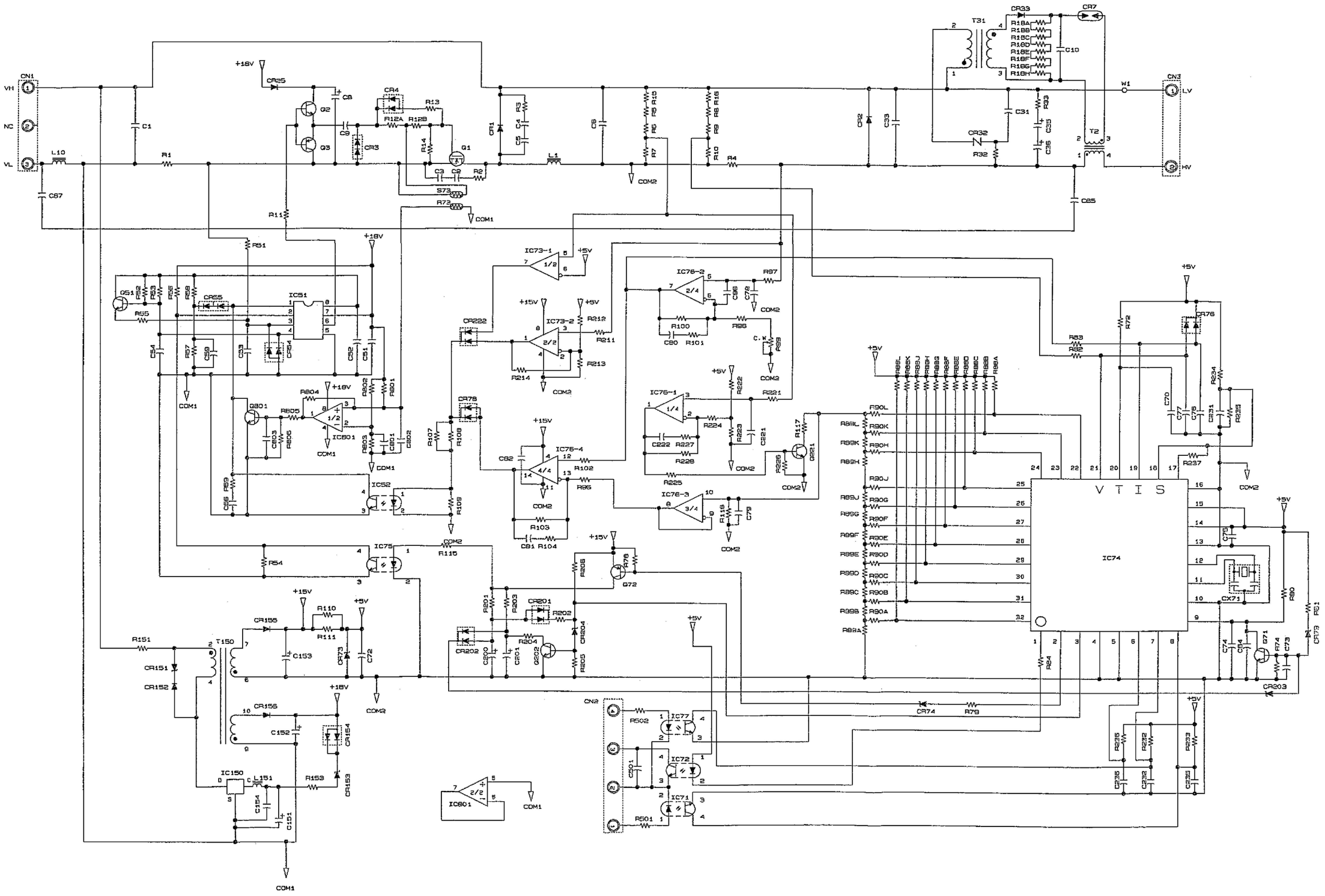
DRIVE PCB - 10

DRIVE PCB - 11
(CP-X430WA only)

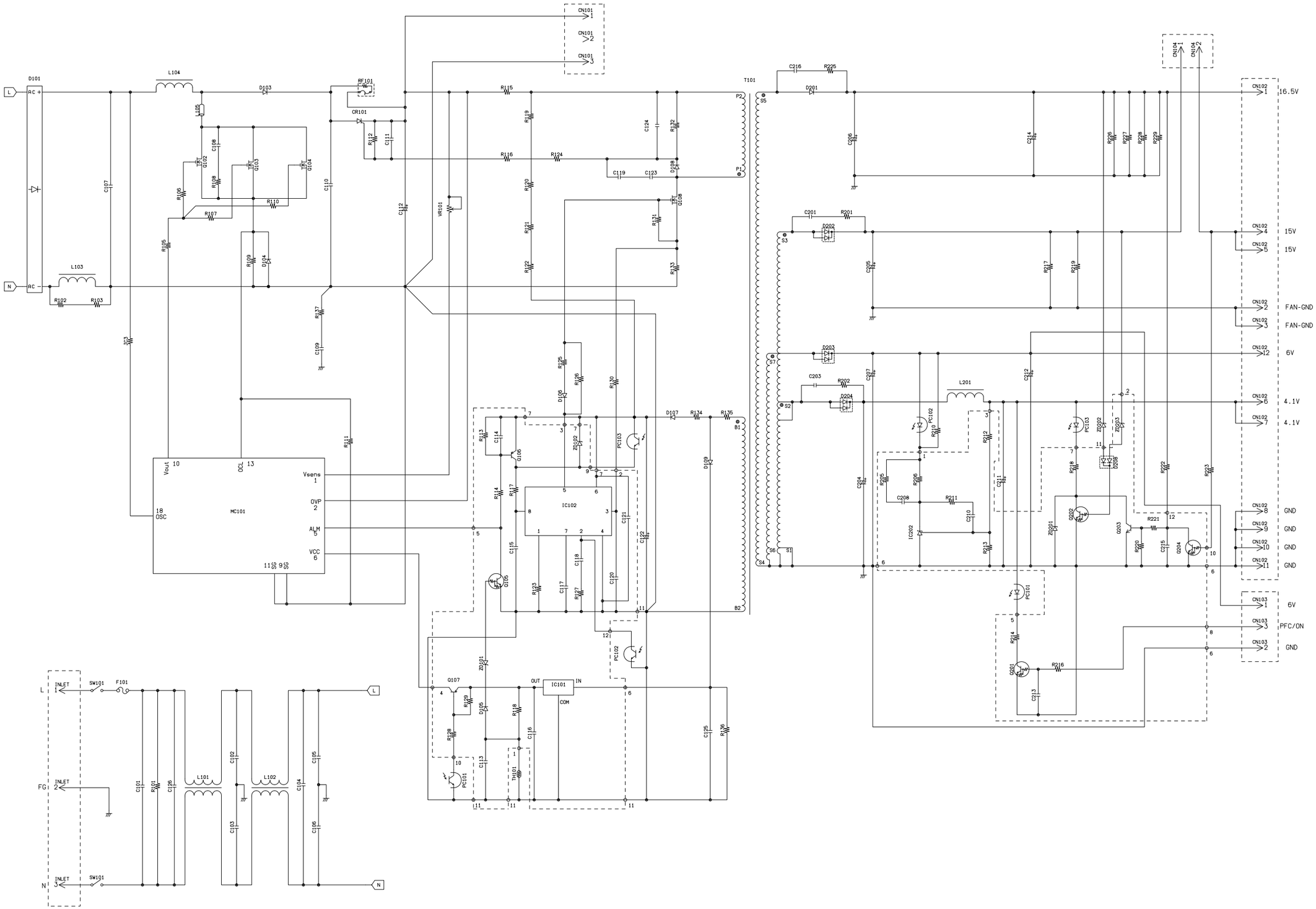
SIGNAL PCB - 1

SIGNAL PCB - 2

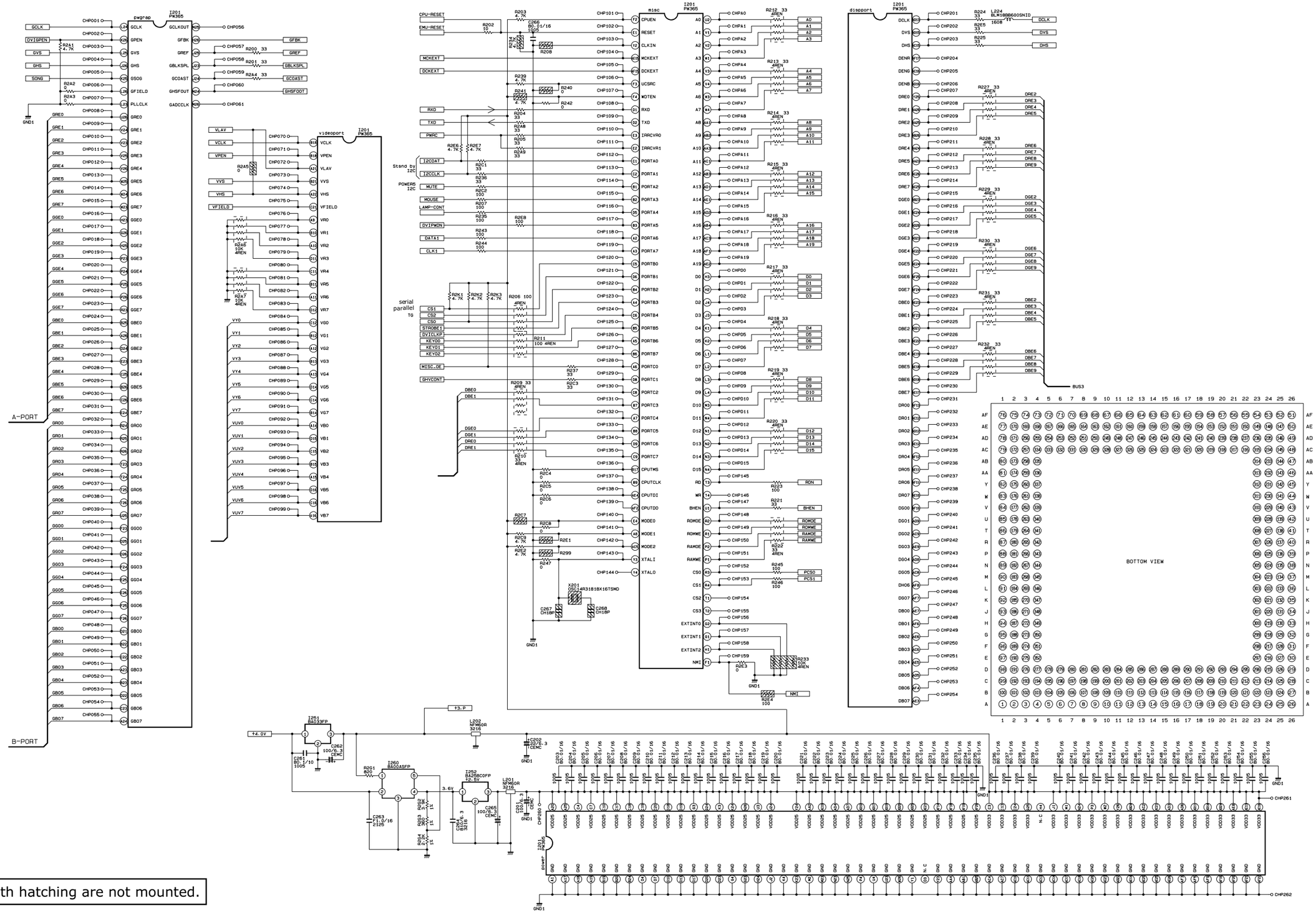
SIGNAL PCB - 3



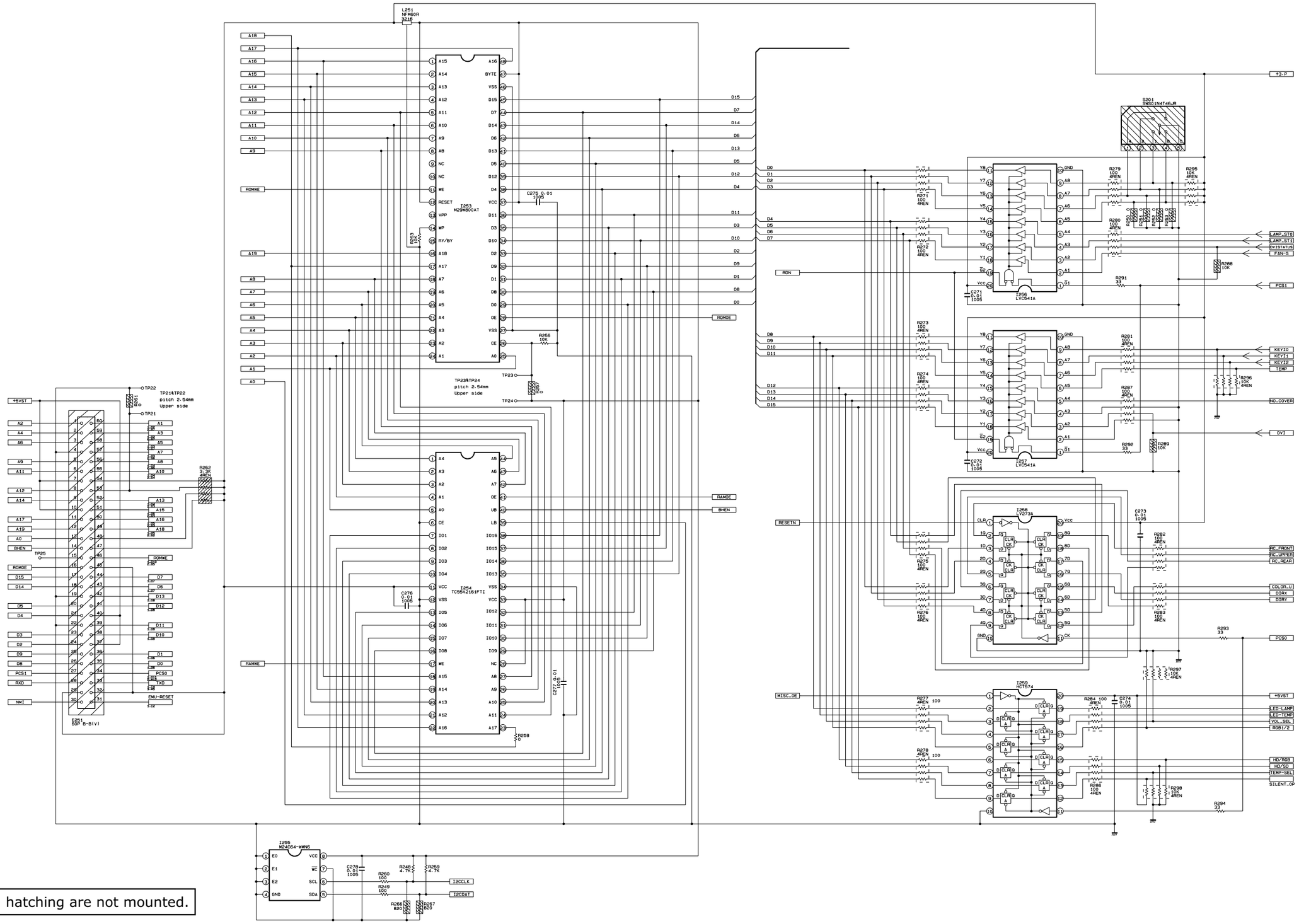
SM0538	POWER UNIT (BALLAST)	HITACHI



SM0538	POWER UNIT (CIRCUIT)	HITACHI

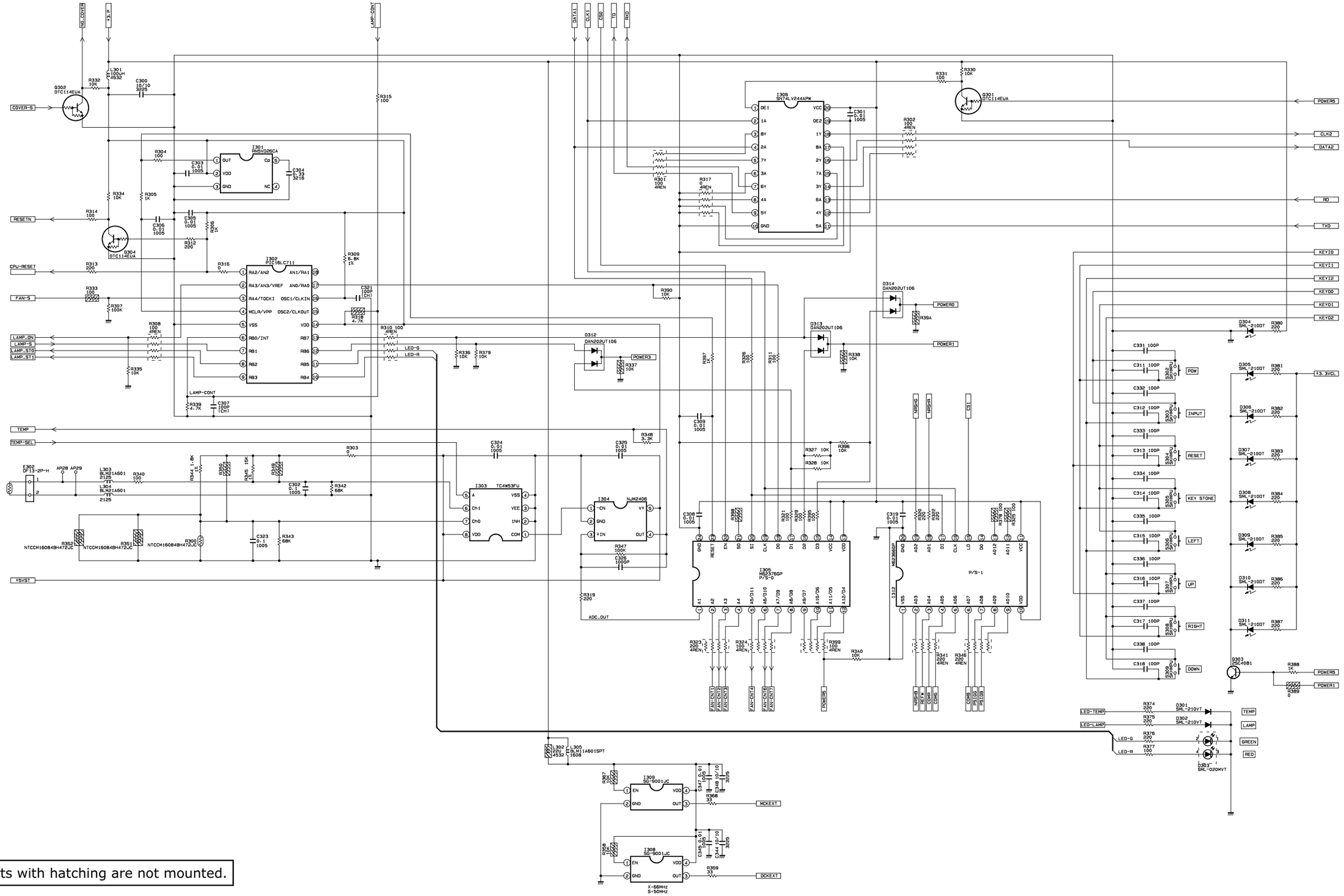


SM0538	DRIVE BOARD - 1	HITACHI



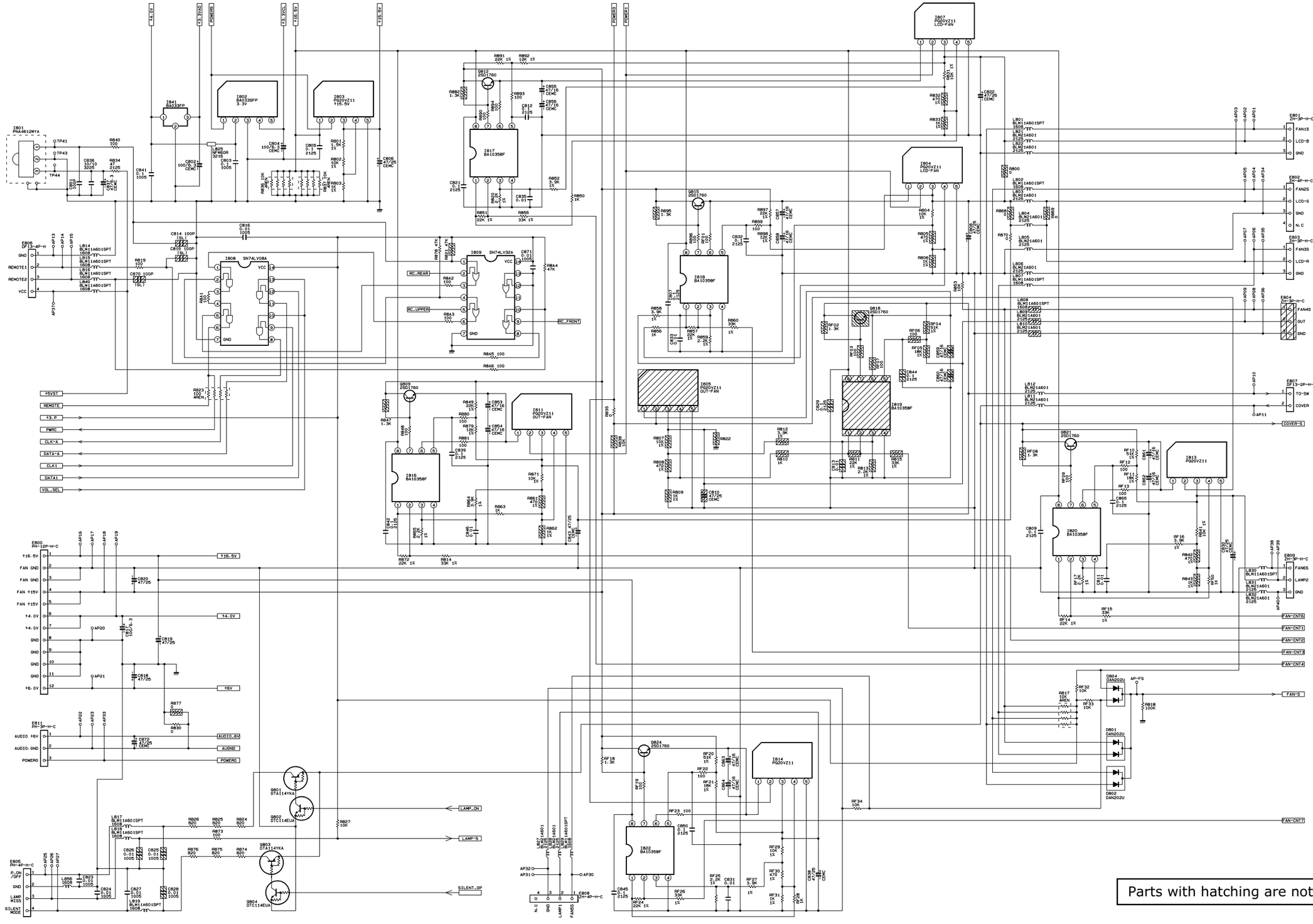
Parts with hatching are not mounted.

SM0538	DRIVE BOARD - 2	HITACHI



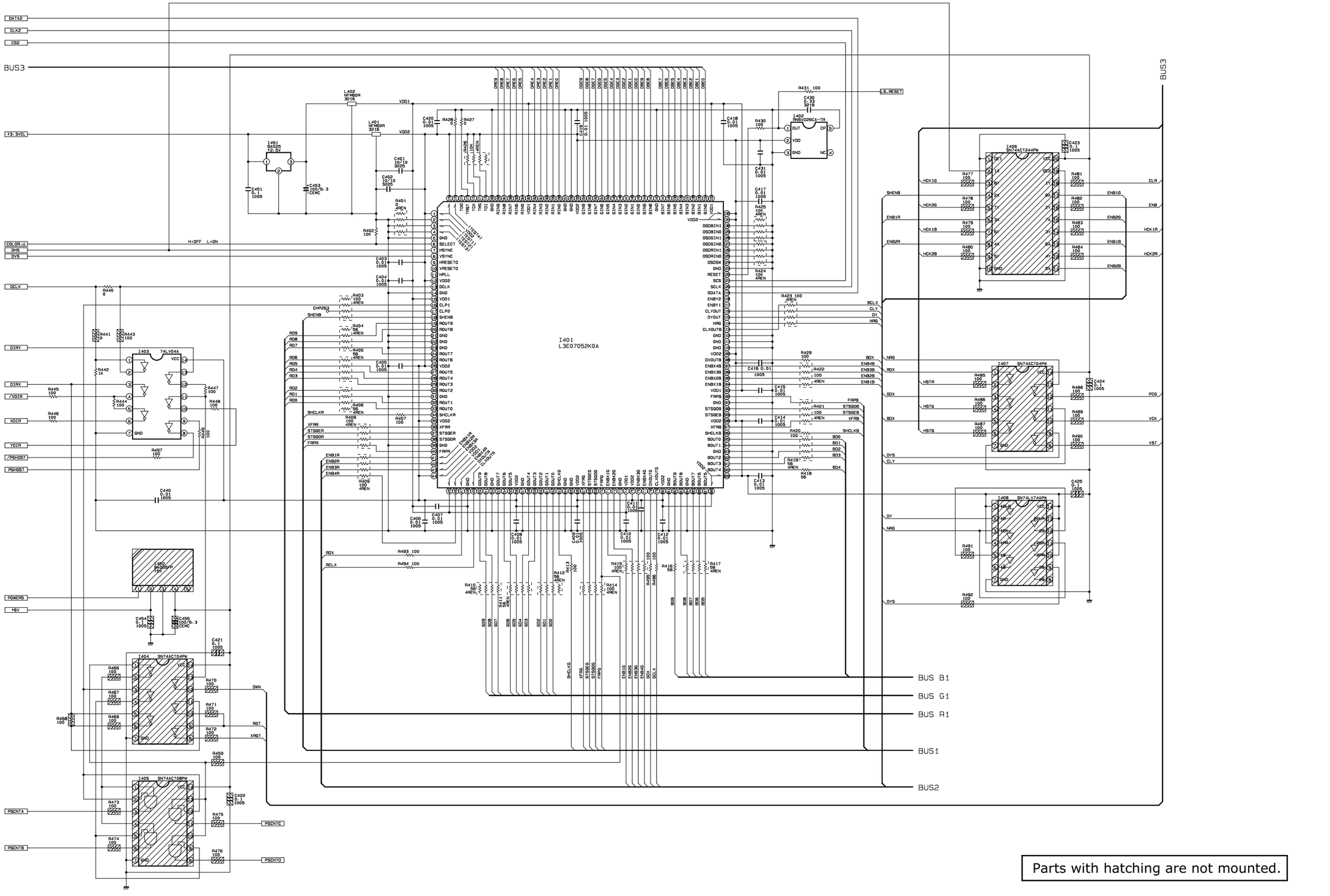
Parts with hatching are not mounted.

SM0538	DRIVE BOARD - 3	HITACHI



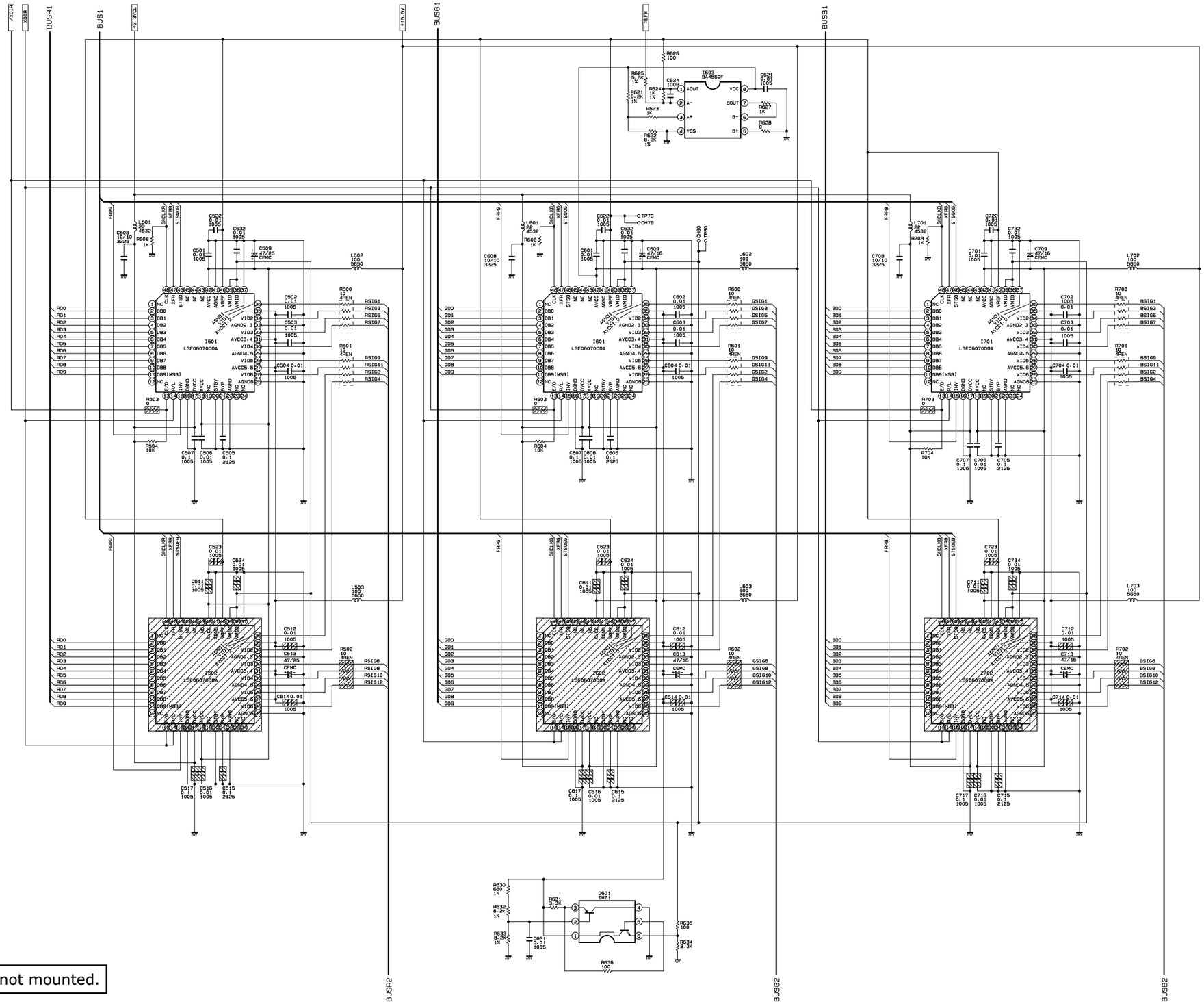
Parts with hatching are not mounted.

SM0538	DRIVE BOARD - 4	HITACHI



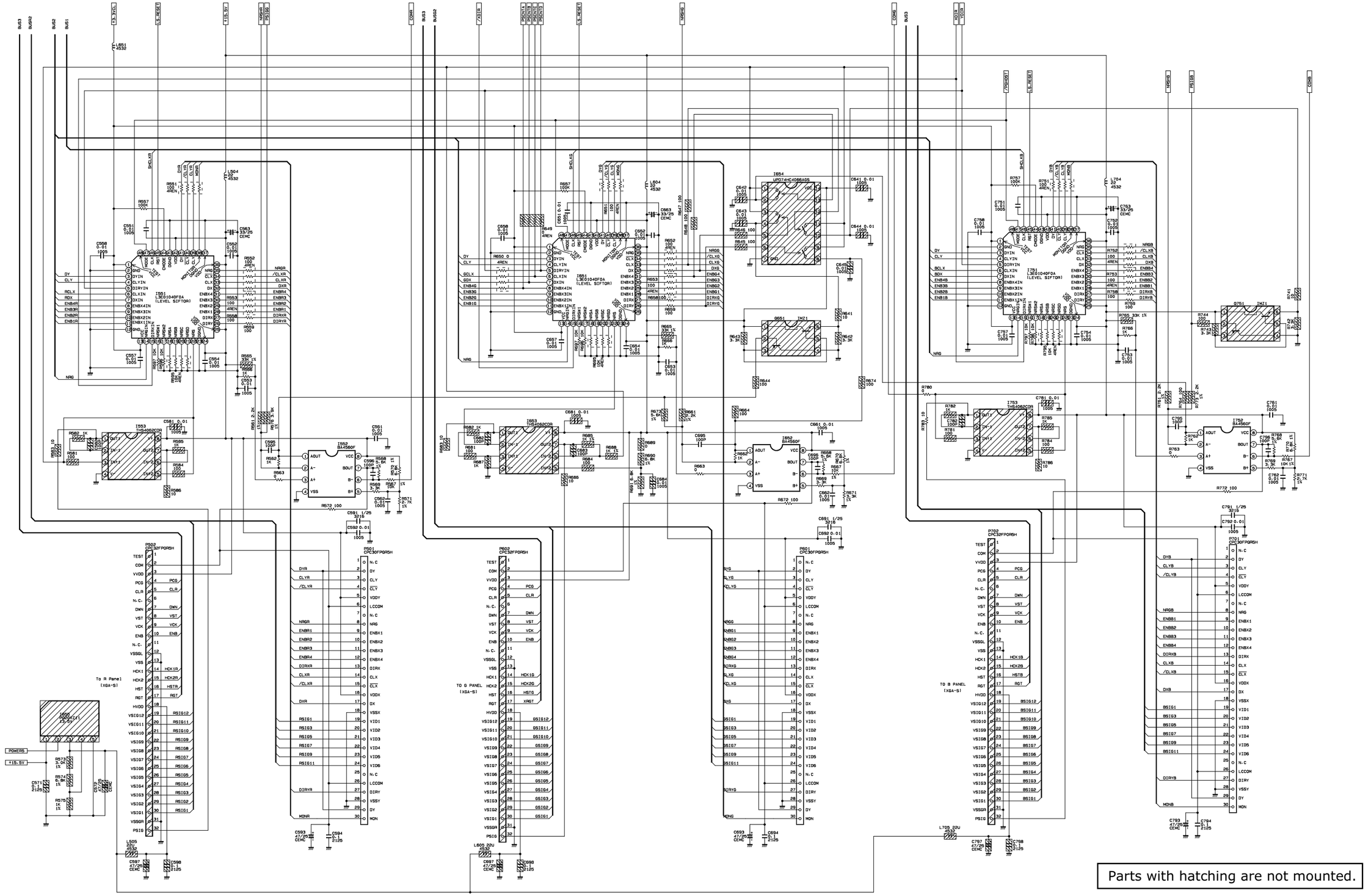
Parts with hatching are not mounted.

SM0538	DRIVE BOARD - 5	HITACHI

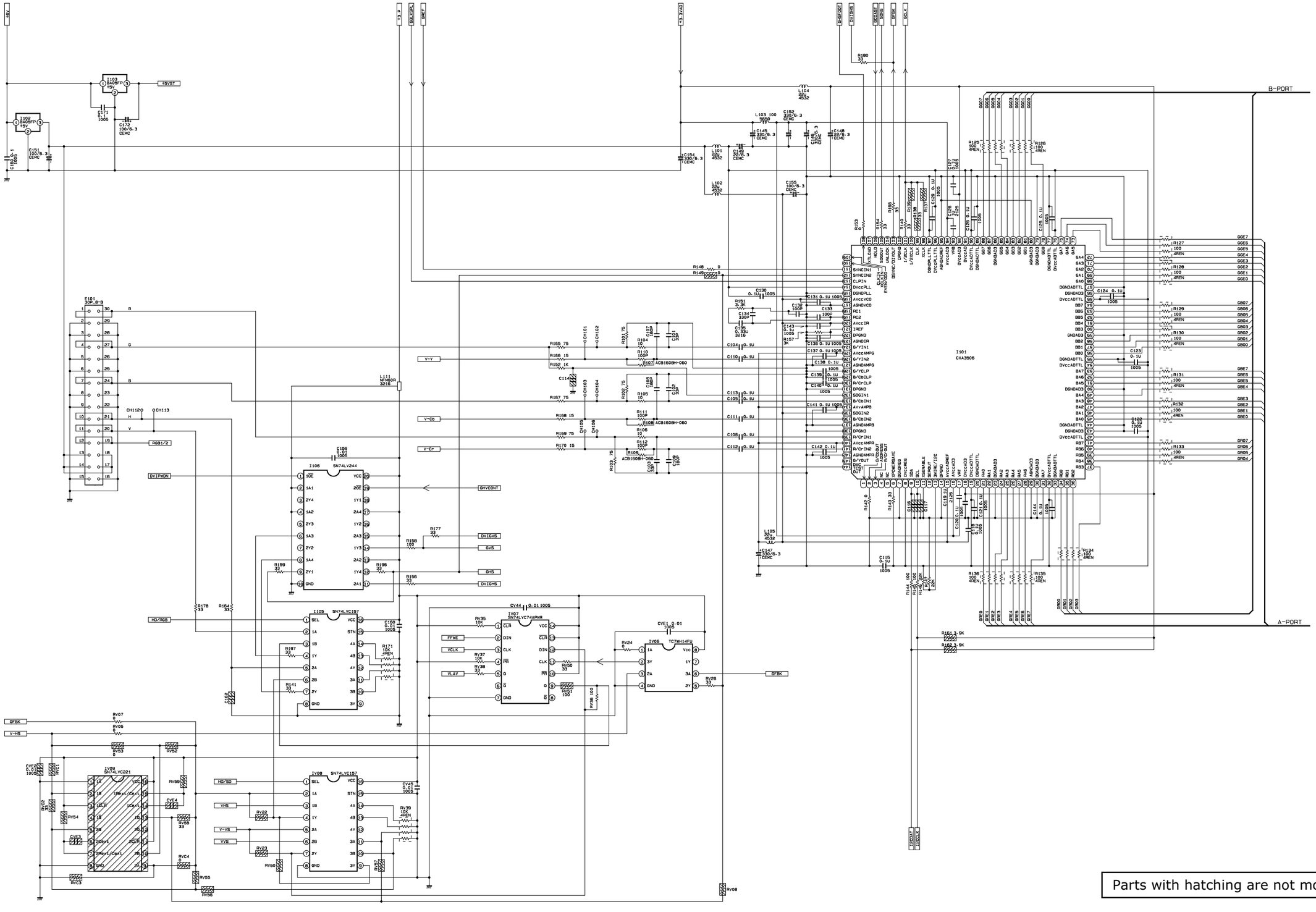


Parts with hatching are not mounted.

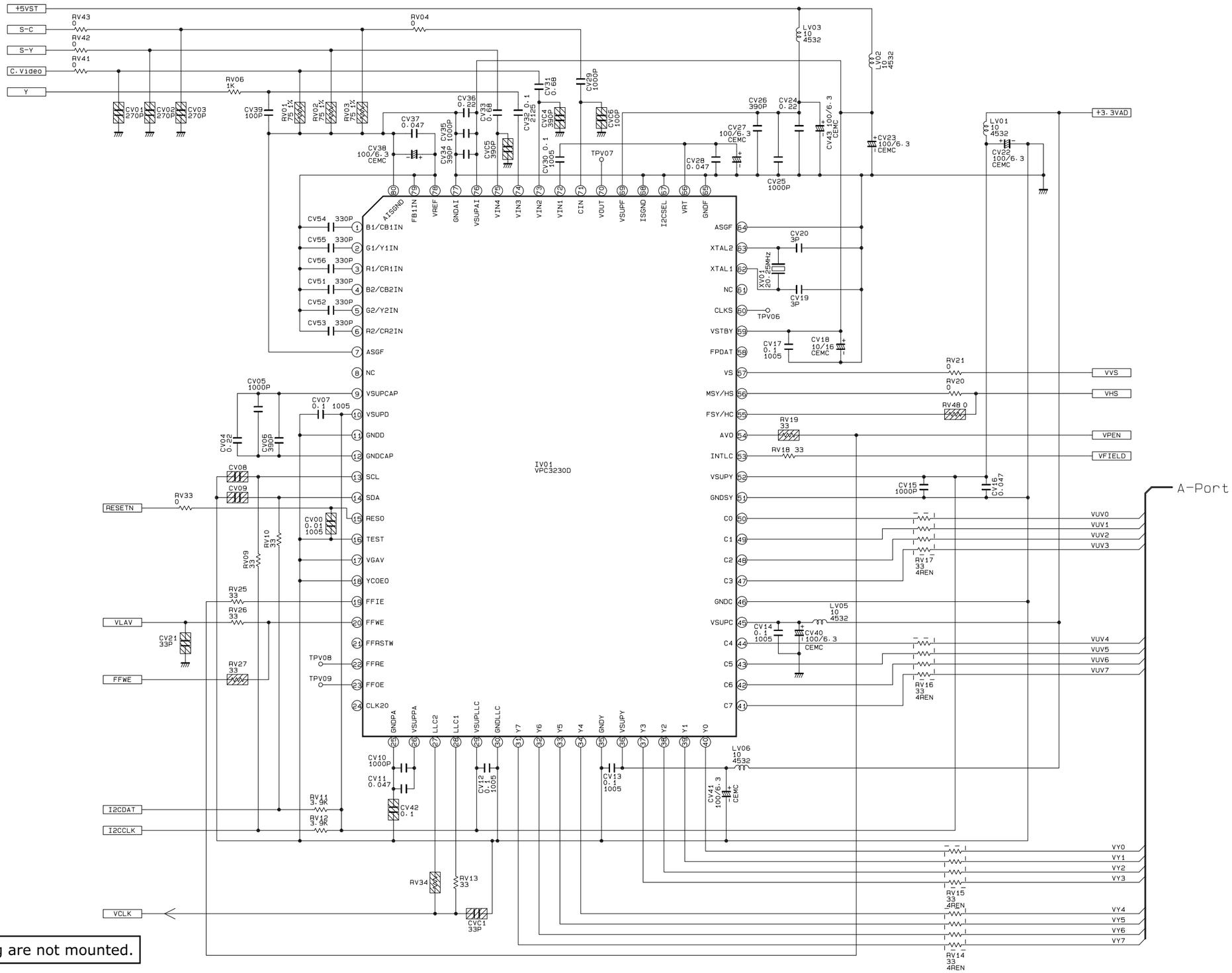
SM0538	DRIVE BOARD - 6	HITACHI



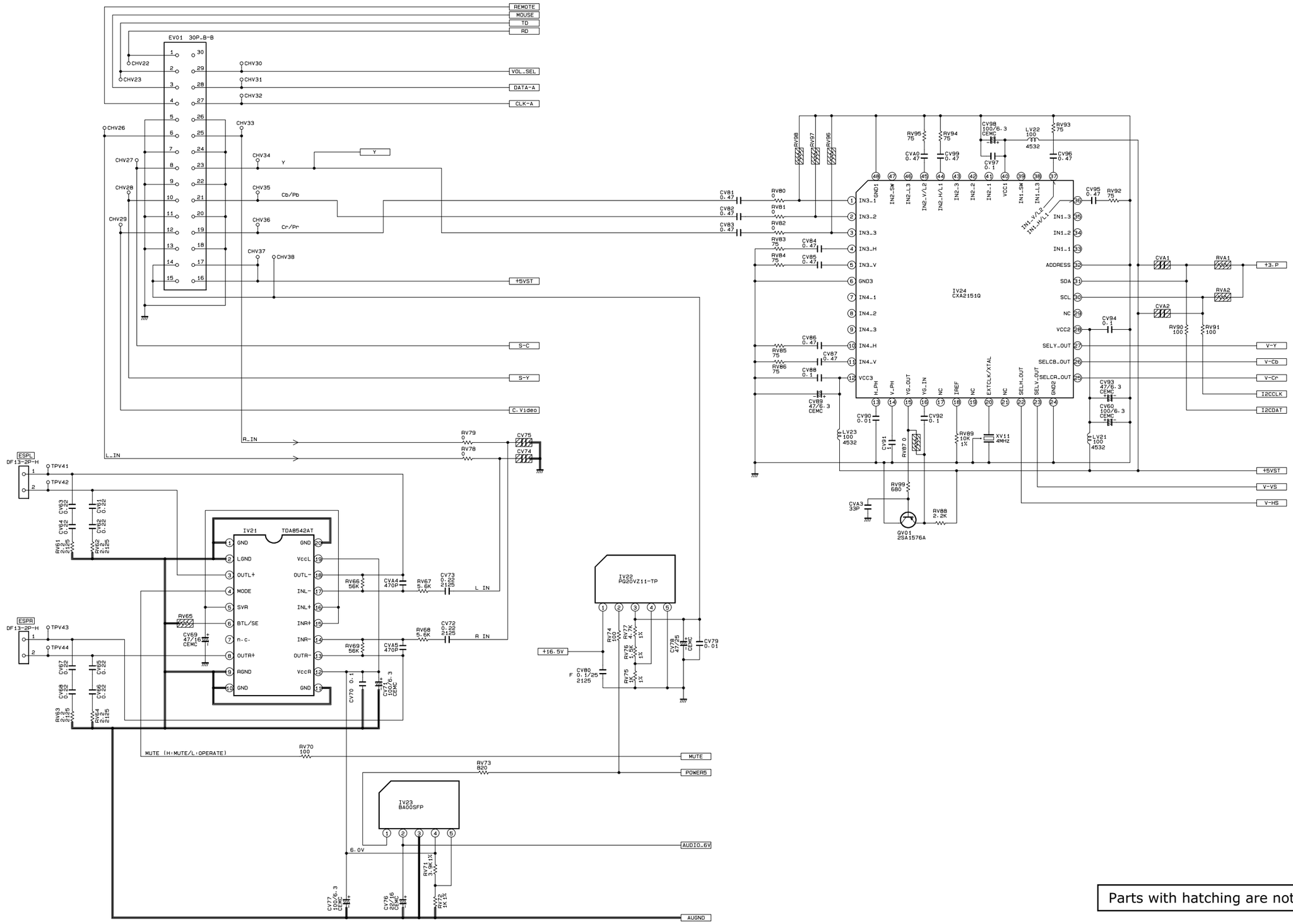
SM0538	DRIVE BOARD - 7	HITACHI



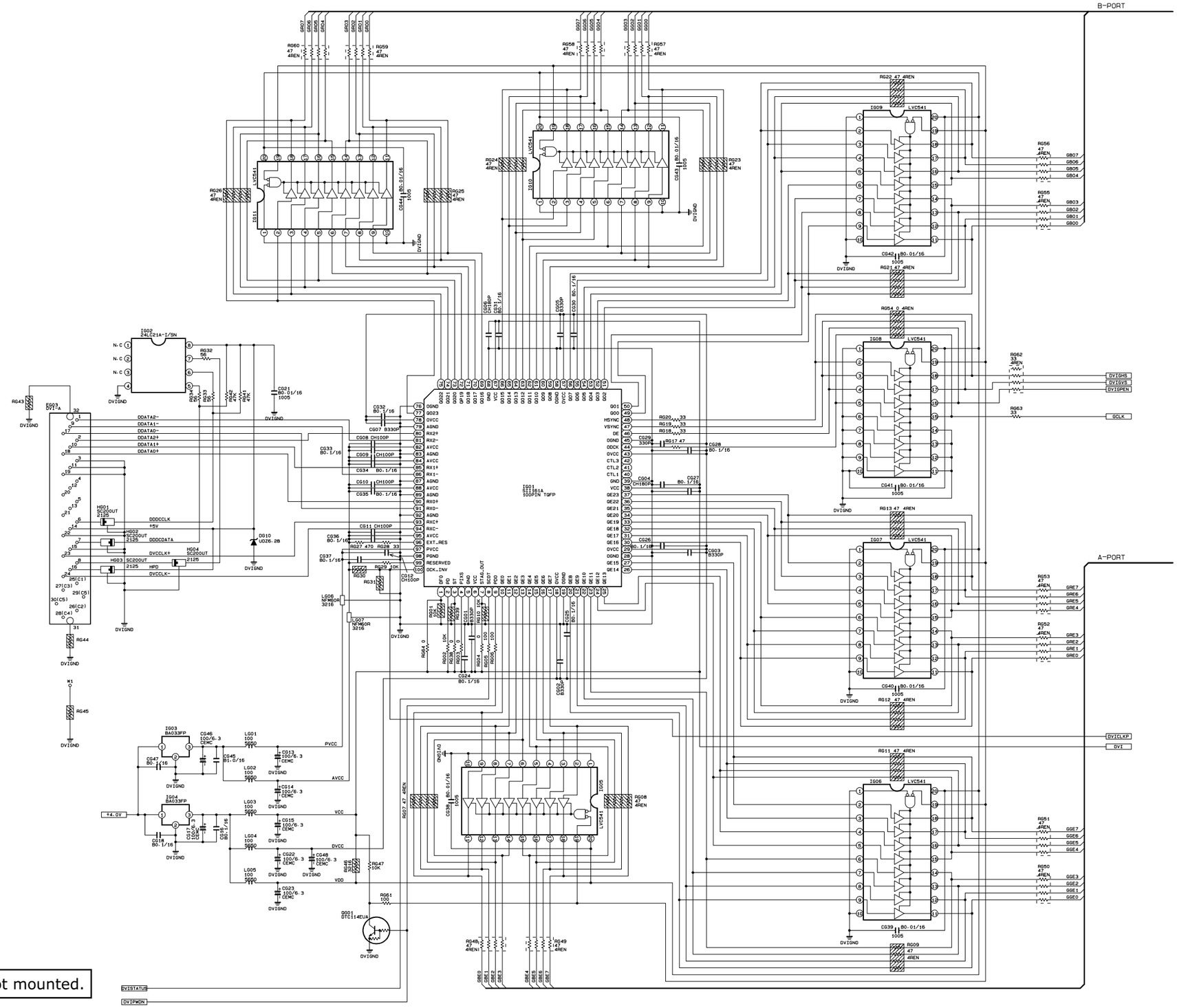
SM0538	DRIVE BOARD - 8	HITACHI



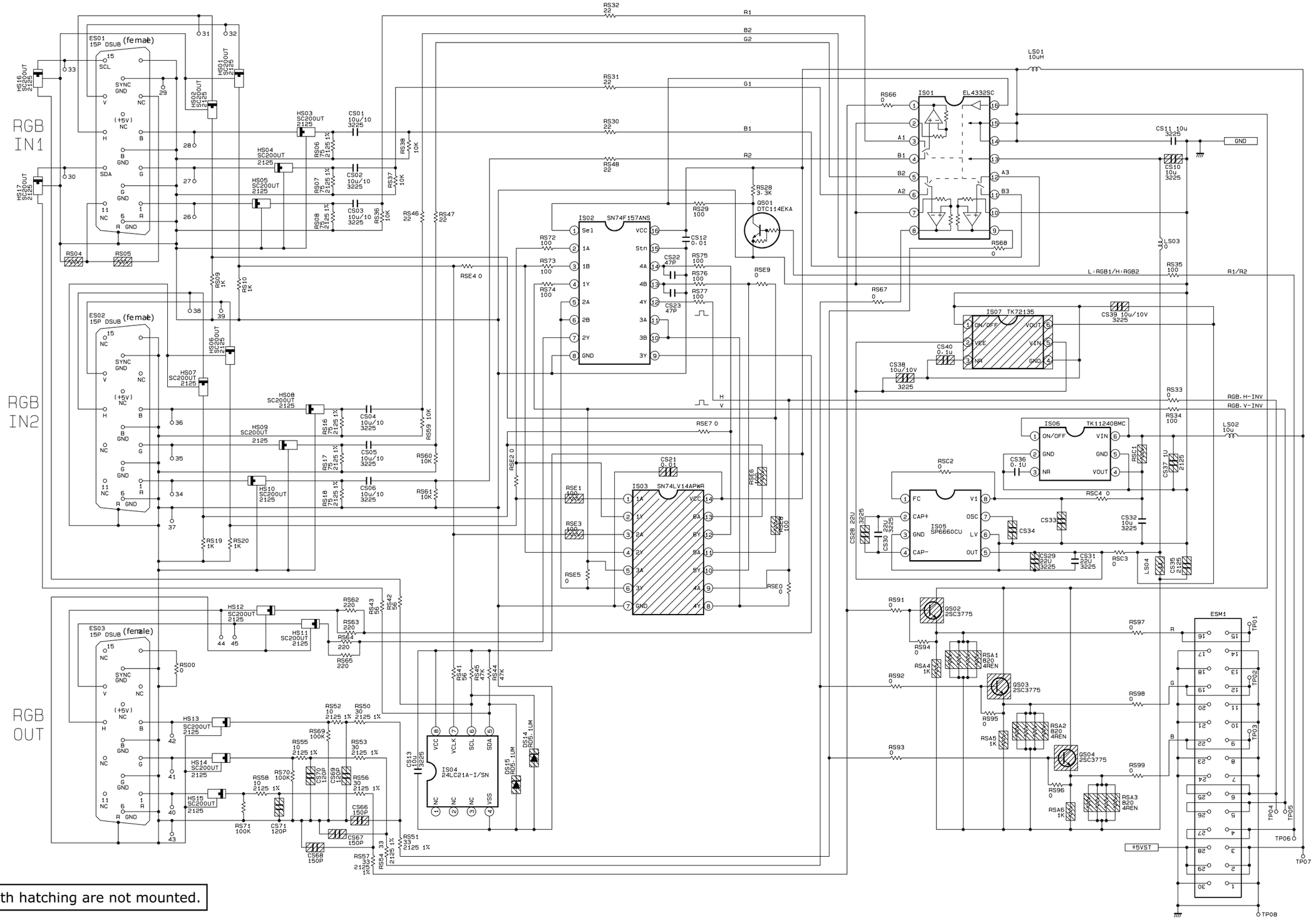
Parts with hatching are not mounted.



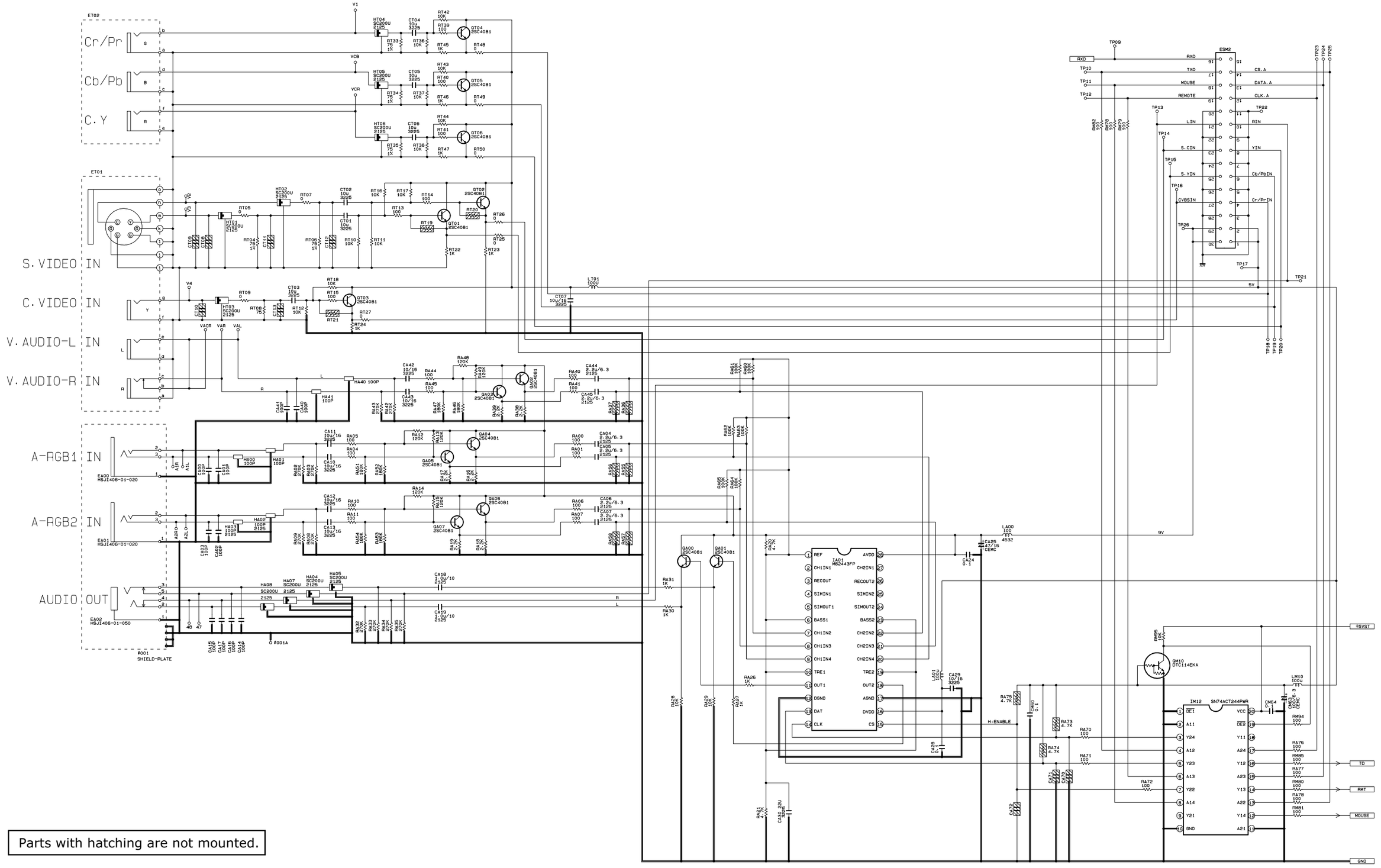
Parts with hatching are not mounted.



SM0538	DRIVE BOARD - 11	HITACHI

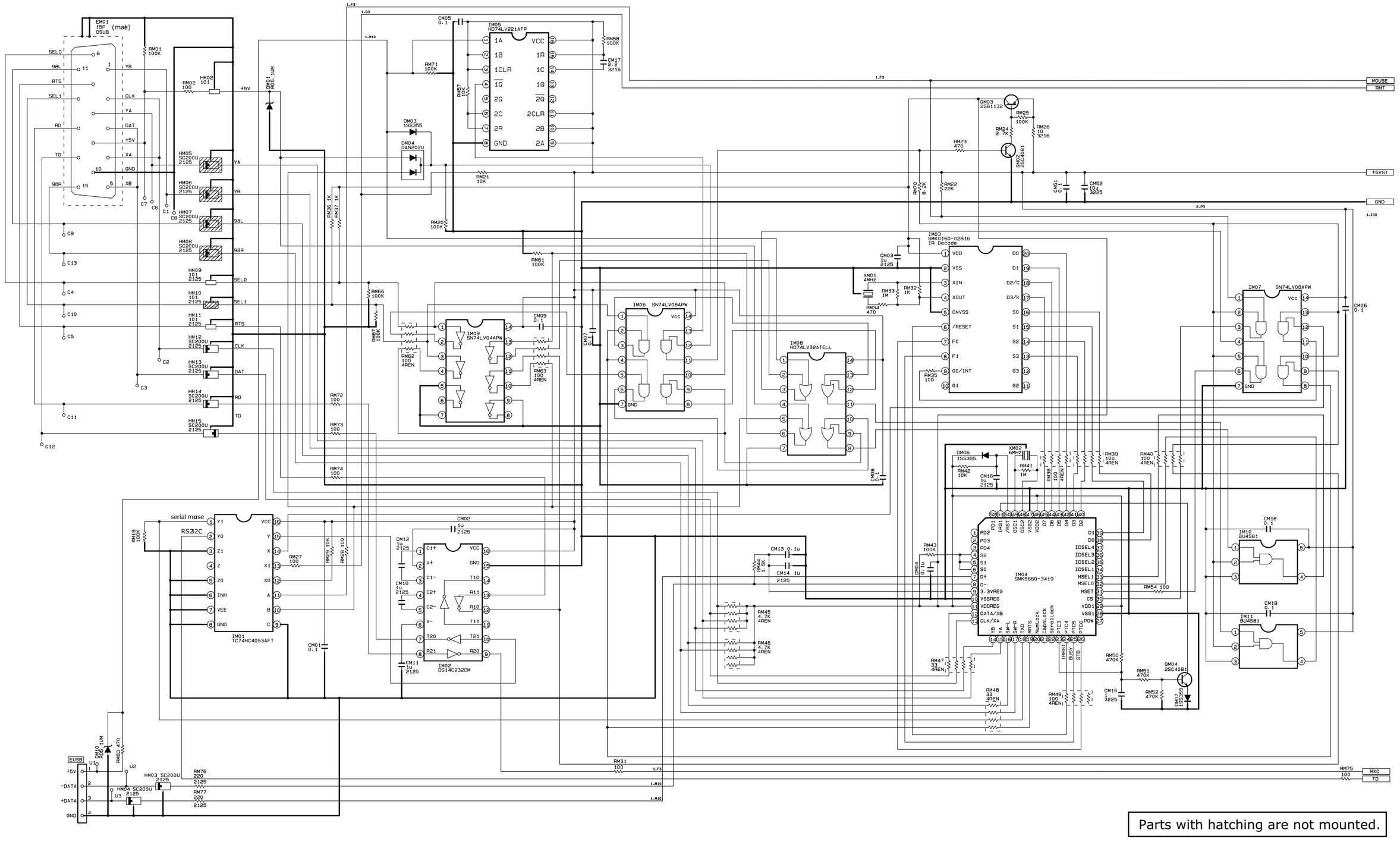


SM0538	SIGNAL BOARD - 1	HITACHI



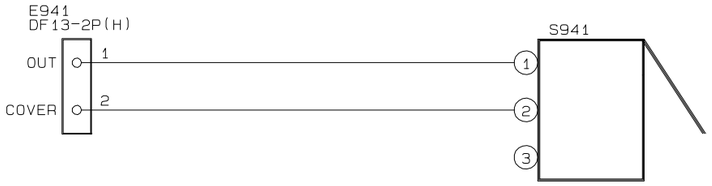
Parts with hatching are not mounted.

SM0538	SIGNAL BOARD - 2	HITACHI

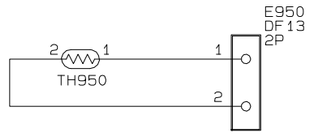


Parts with hatching are not mounted.

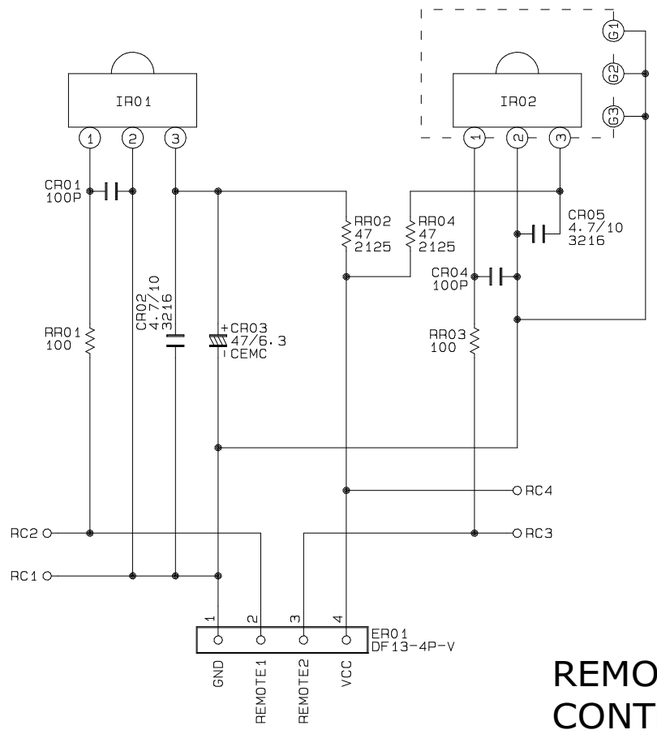
SM0538	SIGNAL BOARD - 3	HITACHI



LIMIT SWITCH



SENSOR



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